Exhibit G

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

Patent No. 8,792,008
Filing Date: September 10, 2012
Issue Date: July 29, 2014
Title: METHOD AND APPARATUS FOR SPECTRUM MONITORING

Inter Partes Review No.: IPR2024-00441

DECLARATION OF DAVID B. LETT

IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.100 *et seq.*

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I, David B. Lett, declare that I have personal knowledge of the facts set forth in this declaration and, if called to testify as a witness, could and would do so competently.

1. INTRODUCTION

1. I have been retained as an expert witness on behalf of the Petitioner, Comcast Cable Communications, LLC, for the above-referenced *inter partes* review proceeding.

2. I have been asked to provide a declaration regarding certain matters pertaining to U.S. Patent No. 8,792,008 ("the '008 Patent") (Ex. 1001) and the unpatentability grounds set forth in the Petition for this proceeding. My experience with television distribution systems, Set-Top Boxes (STBs), and content delivery systems provides me with an understanding of the subject matter described and claimed in the '008 Patent.

3. I am being compensated at my usual consulting rate or testimony rate of $385 per hour. My compensation is in no way dependent upon my opinions or testimony or the outcome of this proceeding. I have no financial interest in the party or in the outcome of this proceeding.

2. PROFESSIONAL BACKGROUND AND QUALIFICATIONS

4. I am a technical consultant and product development industry veteran with expertise in electronics, software, hardware, video, audio, and data communications, having led product development organizations in cable, satellite,

consumer electronics, home automation, asset tracking, remote tank logistics, and alarm industries. My current curriculum vitae is attached as Ex. 1003 and some highlights follow.

5. I earned my B.S. in Electrical Engineering (1982) with high honors from the University of Tennessee in Knoxville, Tennessee. I also attended the Georgia Institute of Technology from 1986 to 1987, completing 40% of the required degree hours for the M.S. Electrical Engineering program.

6. From 1982 to 1985, I worked at Scientific Atlanta as an Electrical Engineer designing video, audio, and data communications equipment for the cable television industry. I designed software and hardware including addressable data transmitters, video sync suppression scramblers, transaction format converters, and data channel monitors for addressable Cable Television systems and Set-Top Boxes.

7. From 1983 to 1985, while working at Scientific Atlanta, I also worked as an Assistant Professor at DeVry Institute of Technology, teaching courses in electronics and microprocessor hardware/software.

8. From 1985 to 1990, I worked at Wegener Communications as a Senior Electrical engineer, designing satellite communications equipment including forward error correction (FEC) coding systems, PSK modems, and analog control systems for RF modulators and PSK demodulators. I was promoted to the Hardware Engineering Manager, where I managed product development of video, audio, and

data satellite receivers, modulators, graphics display systems, DSP-based compandors, FSK and PSK satellite modems, multiplexers, forward error correction (FEC) codecs, RF upconverters and downconverters, and baseband analog and digital processing components.

9. In 1990, I returned to Scientific Atlanta, which was acquired by Cisco in 2006. I worked as Engineering Manager running the set-top box engineering group where I was promoted to Director and Vice President during my tenure until 2011. I led the design of many cable set-top boxes and systems through the evolution of analog video, addressability, downloadable software, electronic program guides, digital video, VOD, software applications, high-definition TV, DVR, DOCSIS, full spectrum tuners, and multiroom DVR. These systems implemented various technologies including DOCSIS 1/2/3 and hybrid gateways, IEEE 802.11, IPTV, DVR, cable modems, ADSL, VDSL, DVB-T/C/S, bootloaders, factory diagnostics, application frameworks, Nagra, DRMs, conditional access, secure microprocessors, device management, Android, Adobe Flash, Linux, DVD play/record, MPEG-4, MPEG-2, H.264, NTSC, PAL, DAVIC, MoCA, high-performance CPUs, cablecards, network processors, HDMI, multiple video/audio display interfaces, 2D/3D graphics, multiple RF tuners, and full spectrum tuners.

10. From 2011 to 2016, I worked for EchoStar Technologies, which served as the product development organization for sister company DISH Network. I served

as Vice President of Engineering and was the Head of the Atlanta research and development center. I led the development of satellite set-top boxes, consumer electronic equipment, and a home automation and security system. Technologies used included video/audio, IoT, H.265, HEVC, 3D, Satellite, wireless, MoCA, transcoding, embedded C Linux applications, mobile applications (IOS and Android), SaaS, web applications (JavaScript, HTML), BSS/OSS, AWS cloud storage, 2-way video/audio streaming, authentication, and VoIP.

11. In 2016, I started an independent consulting business in technology and intellectual property projects. I have consulted in various technology areas and industries including consumer electronics, Internet of Things (IoT), cable, satellite, television, media, and cryptocurrency.

12. From 2019 to 2022, I worked as Chief Technology Officer for Telular, an Ametek company. I was responsible for the development of Industrial Internet of Things (IIoT) recurring revenue solutions, combining wireless technologies, purpose-built hardware, and SaaS in the commercial telematics, security and home automation markets and sold under the SkyBitz and Telguard brands.

13. My record of professional service includes awards on products I designed and developed from several organizations in my field of expertise, including Best of Show, Technology Emmy, and Best of Innovations.

14. I am a named inventor on at least 87 patents and published patent applications corresponding to the areas of my professional work. The patents and published applications involving video and audio technologies include:

- U.S. Patent No. 9,882,736 titled "Remote Sound Generation for a Home Automation System"
- U.S. Patent No. 9,615,139 titled "Determining Device That Performs Processing of Output Pictures"
- U.S. Patent No. 8,549,567 titled "Media Content Sharing Over a Home Network"
- U.S. Patent No. 8,161,388 titled "Interactive Discovery of Display Device Characteristics"
- U.S. Patent Nos. 8,120,924, 7,240,217, 6,785,817, 6,564,324, 6,212,278, and 5,440,632 titled "Reprogrammable Subscriber Terminal"
- U.S. Patent No. 7,908,625 titled "Networked Multimedia System"
- U.S. Patent Nos. 7,861,272 and 7,849,486 titled "Networked Subscriber Television Distribution"
- U.S. Patent Nos. 7,774,820 and 7,069,578 titled "Settop Cable Television Control Device and Method Including Bootloader Software and Code Version Table for Maintaining and Updating Settop Receiver Operating System Software"
- U.S. Patent No. 5,771,064 titled "Home Communications Terminal Having an Applications Module"
- U.S. Patent No. 5,715,515 titled "Method and Apparatus for Downloading On-Screen Graphics and Captions to a Television Terminal"
- U.S. Patent No. 5,657,414 titled "Auxiliary Device Control for a Subscriber Terminal"

- U.S. Patent No. 5,592,551 titled "Method and Apparatus for Providing Interactive Electronic Programming Guide"
- U.S. Patent No. 5,539,822 titled "System and Method for Subscriber Interactivity in a Television System"
- U.S. Patent No. 5,357,276 titled "Method of Providing Video On Demand with VCR Like Functions"
- U.S. Patent Application Publication Nos. 2004/0068753 and 2008/0072272 titled "Video Transmission Systems and Methods for a Home Network"
- U.S. Patent Application Publication No. 2004/0133911 titled "Subscriber Network in a Satellite System"

15. I have a general understanding of the U.S. patent prosecution process and of the novelty and non-obviousness requirements for patentability.

16. I believe that my extensive industry experience and educational background qualify me as an expert in the relevant field of television signal processing and communication systems. I am knowledgeable of the relevant skill set that would have been possessed by a hypothetical person of ordinary skill in the art at the time of the invention of the '008 Patent, which I (as I discuss below) understand is late 2011.

3. MATERIALS CONSIDERED

17. In formulating my opinion, I reviewed and considered U.S. Patent No. 8,792,008 to Gallagher et al. (Ex. 1001), as to which I am offering my opinion regarding the validity of certain claims, as discussed herein.

18. In preparing this declaration, I also reviewed and considered the Petition and the file history of the ’008 Patent (included in Ex. 1004) as well as the following references:

Ex. 1003:	Curriculum Vitae of David B. Lett
Ex. 1004:	Certified Prosecution History of the ’008 Patent
Ex. 1005:	Certified Copy of U.S. Provisional Application No. 61/532,098 (“’008 Provisional”)
Ex. 1006:	Reserved
Ex. 1007:	Reserved
Ex. 1008:	Reserved
Ex. 1009:	U.S. Pub. No. 2005/0114879 (“Kamieniecki”)
Ex. 1010:	U.S. Pub. No. 2010/0120386 (“Konstantinos”)
Ex. 1011:	U.S. Patent No. 8,649,421 (“Renken”)
Ex. 1012:	U.S. Provisional Application No. 61/444,611 (“Renken Provisional”)
Ex. 1013:	Reserved
Ex. 1014:	Reserved
Ex. 1015:	U.S. Pub. No. 2004/0181813 (“Ota”)
Ex. 1016:	U.S. Pub. No. 2010/0303181 (“Yu”)
Ex. 1017:	U.S. Pub. No. 2008/0313691 (“Cholas”)
Ex. 1018:	Reserved
Ex. 1019:	Reserved

Ex. 1020: Claim Construction Memorandum Opinion and Order dated June 26, 2023, *Entropic Comms., LLC v. Charter Comms., Inc.*, 2:22-CV-00125-JRG (E.D. Tex.)

Ex. 1021: Reserved

Ex. 1022: Reserved

Ex. 1023: Reserved

Ex. 1024: U.S. Pub. No. 2008/0089402 ("Massey")

Ex. 1025: Reserved

Ex. 1026: Excerpts of W. Ciciora, J. Farmer, D. Large, and M. Adams, "Modern Cable Television Technology Video, Voice, and Data Communications" (2nd ed. 2004) ("Ciciora")

Ex. 1027: U.S. Patent No. 7,340,230 ("Khoini-Poorfard")

Ex. 1028: U.S. Pub. No. 2003/0217362 ("Summers")

Ex. 1029: U.S. Pub. No. 2006/0256799 ("Eng")

4. UNDERSTANDING OF APPLICABLE LEGAL STANDARDS

19. Although I am not an attorney, I have a general understanding of the applicable legal standards pertaining to the patentability issues presented in this proceeding. I understand that the Petitioner is challenging the patentability of the claims of the '008 Patent based on the following grounds:

- Ground A: Claims 1-18 as obvious under pre-AIA 35 U.S.C. § 103(a) based on Kamieniecki in view of Konstantinos.

- Ground B: Claims 7-8 and 15-16 as obvious under pre-AIA 35 U.S.C. § 103(a) based on Kamieniecki in view of Konstantinos and Yu.
- Ground C: Claims 9 and 17 as obvious under pre-AIA 35 U.S.C. § 103(a) based on Kamieniecki in view of Konstantinos and Cholas.
- Ground D: Claims 1-6, 9-14, and 17-18 as obvious under pre-AIA 35 U.S.C. § 103(a) based on Renken.
- Ground E: Claims 9 and 17 as obvious under pre-AIA 35 U.S.C. § 103(a) based on Renken in view of Cholas.

20. I understand that, in this *inter partes* review, Petitioner has the burden of proving that each challenged claim is unpatentable by a preponderance of the evidence.

21. I understand that to be valid, a patent claim must be "novel," and is invalid if "anticipated" by a single prior art reference. I further understand a reference anticipates if it discloses each and every element as arranged in the claim so as to enable a person of ordinary skill in the art to make and use the claimed invention without undue experimentation.

22. I understand that a patent claim is unpatentable if, at the time of the invention, it would have been obvious to one of ordinary skill in the art to combine the teachings of the prior art to yield the patent claim. It is my understanding that

this determination is made after weighing the following factors: (1) the level of ordinary skill in the pertinent art; (2) the scope and content of the prior art; (3) the differences between the prior art as a whole and the claim at issue; and (4) as appropriate, other objective considerations identified below.

23. It is my understanding that the prior art and claimed invention should be viewed through the knowledge and understanding of a person of ordinary skill in the art – one should not use his or her own insight or hindsight in deciding whether a claim is obvious. I further understand that a claim may be rendered obvious if a person of ordinary skill in the art can implement the claimed invention as a predictable variation of a known product. I further understand that a person of ordinary skill in the art is presumed to have knowledge of the relevant prior art at the time of the claimed invention, which comprises any prior art that was reasonably pertinent to the particular problems the inventor faced.

24. I understand that a showing of obviousness requires some articulated reasoning with a rational underpinning to support the combination of the references. I understand that in consideration of the issue of obviousness it is important to identify whether a reason existed at the time of the invention that would have led a person of ordinary skill in the pertinent art to combine elements of the references in a way that yields the claimed invention.

25. I understand that a claim may be considered unpatentable for obviousness for various reasons. I have been informed that the following exemplary rationales may support a finding of obviousness:

(A) combining prior art elements according to known methods to yield predictable results;

(B) substituting one known element for another to obtain predictable results;

(C) use of a known technique to improve similar devices in the same way;

(D) applying a known technique to a known device ready for improvement to yield predictable results;

(E) choosing from a finite number of identified, predictable solutions with a reasonable expectation of success;

(F) known work in a field that prompts variations in the work in the same or a different field that leads to predictable results; and

(G) some teaching, suggestion, or motivation in the prior art that would have led a person of ordinary skill in the art to modify a prior art reference or combine multiple prior art references or teachings to arrive at the claimed invention.

26. I understand that various objective or "real world" factors may be indicative of non-obviousness. I understand that such factors include:

(A) the commercial success of the claimed invention;

(B) the existence of a long-felt, unresolved need for a solution to the problem solved by the claimed invention;

(C) failed attempts to solve the problem solved by the claimed invention;

(D) copying of the claimed invention;

(E) unexpected results of the claimed invention;

(F) praise for the claimed invention by others in the relevant field; and

(G) willingness of others to accept a license under the patent because of the merits of the claimed invention.

27. It is my understanding that the prior art references themselves may provide a suggestion, motivation, or reason to combine, but other times the link may be based on the common sense of the person of ordinary skill in the pertinent art. I further understand that obviousness analysis recognizes that market demand, rather than scientific literature, often drives innovation, and market demand is sufficient motivation to combine references.

28. It is my understanding that a particular combination may be proven obvious merely by showing that it was obvious to try the combination. For example, common sense is a good reason for a person of ordinary skill to pursue known options when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions.

29. I further understand that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill in the art, not just the patentee. Accordingly, it is my understanding that any need or problem known in the field at the time of invention and addressed by the patent can provide a reason for combining the limitations in the manner claimed.

30. It is my understanding that a patent or printed publication is entitled to claim the benefit of the filing date of an earlier-filed application if the disclosure of the earlier-filed application provides support for the claims in the patent or printed publication. It is my understanding that in order for the earlier-filed application to provide such support, it must describe the claimed invention in sufficient detail that a POSITA can reasonably conclude that the inventor was in possession of the claimed invention, and that it must provide sufficient detail to enable a POSITA to make and use the claimed invention without resorting to undue experimentation.

5. OVERVIEW OF THE ’008 PATENT

31. The ’008 Patent is entitled “Method and Apparatus for Spectrum Monitoring,” and generally relates to a receiver that can receive a signal comprising television and data channels, measure a characteristic of a portion of the signal, and report those characteristics back to a source of the signal. Ex. 1001, 1:27-31, 1:54-57, 2:44-3:4, 3:33-60.

32. Figure 1A of the '008 Patent shows an example of its overall architecture. A headend 108 receives television signals via antenna 102 and/or satellite dish 104, and data via an Internet Protocol (IP) Network (e.g., Internet) 106, and transmits them as downstream signals to various customer gateways 120a, 120b via hybrid fiber-coaxial (HFC) network 118. Ex. 1001, 2:34-3:4, Fig. 1A.

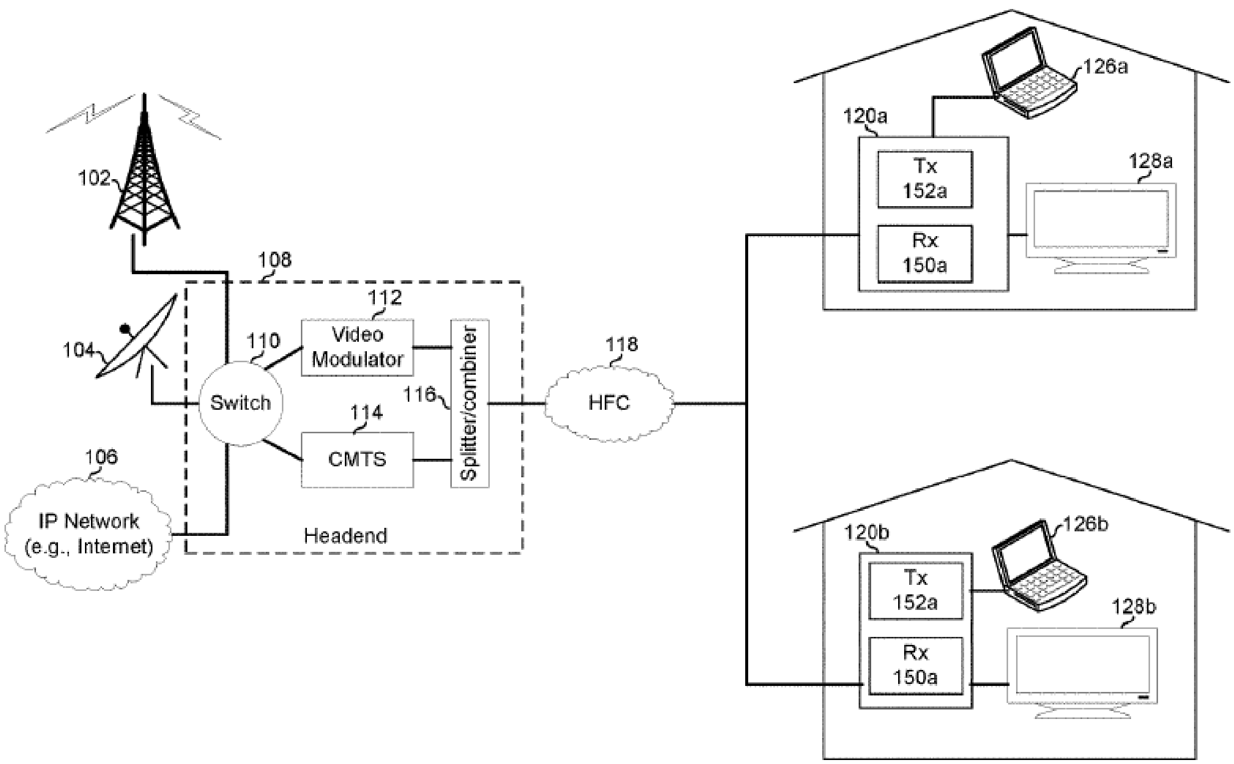

FIG. 1A

Ex. 1001, Fig. 1A

33. Signal monitoring is performed by a receiver circuit 100, an example of which is shown in Figure 1B, that resides within the gateways 120a, 120b. Ex.

1001, 3:5-60, Fig. 1B. Within the receiver 100, there is a radio frequency (RF) front end 158 (**red**) that receives an RF signal S and digitizes it to generate a corresponding digital signal D and provide it to a channelizer 152[1] (**green**) that selects frequency bands within the signal S and outputs them to a monitoring module 154 (**blue**) and/or a data processing module 156 (**purple**). Ex. 1001, 3:16-4:64, 6:36-53, Fig. 1B.

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[1] Fig. 1B of the '008 Patent uses number '152' for the channelizer, but the specification and Figure 3 use numeral '102.' Ex. 1001 (3:9, 20, 29, 34, etc.). I believe '152' was intended, since '102' is already used for the antenna 102. Ex. 1001, 2:36.

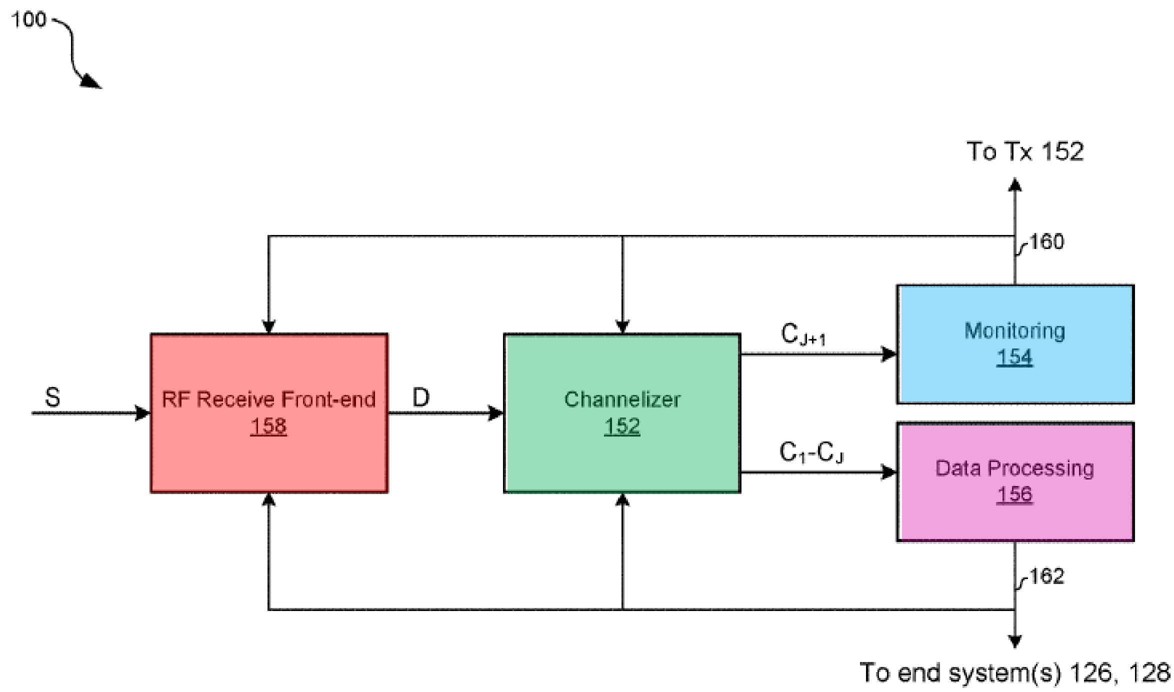


FIG. 1B

Ex. 1001, Fig. 1B (annotated)

34. The monitoring module 154 (**blue**) analyzes the band it receives to measure/determine various signal characteristics such as power level vs. frequency and signal-to-noise ratio, and can control transmission of network management/maintenance messages that can comprise the measured/determined characteristics and/or indicate whether a communication parameter of a channel is outside acceptable bounds. Ex. 1001, 3:32-60. These messages may be sent to a

source of the signal S – e.g., the headend 108. Ex. 1001, 2:60-3:4, 3:45-60. The ’008 Patent describes the monitoring module 154 largely in functional terms, and does not provide any details or examples of the structure of the monitoring module 154, other than a general statement that the term “module” in the ’008 Patent refers to “functions that can be implemented in hardware, software, firmware, or any combination of one or more thereof.” Ex. 1001, 2:21-33, 3:33-60.

35. The data processing module 156 (**purple**) processes the bands it receives to recover the data on the television channel(s) that was (are) within the band(s). Ex. 1001, 3:61-4:6. The data processing module 156 can then output corresponding data to an interface, such as HDMI (High Definition Multimedia Interface) and/or Ethernet. Ex. 1001, 3:44-4:6, Fig. 1B.

5.1 Prosecution History

36. U.S. Application No. 13/607,916, which led to the ’008 Patent, was filed on September 10, 2012. Ex. 1001, cover; Ex. 1004, pp. 1-5, 44-45. This application claimed priority to U.S. Provisional Application No. 61/532,098, which was filed on September 8, 2011. Ex. 1001, cover; Ex. 1004, pp. 2-5, 7, 44-45.

37. On January 16, 2014, a Non-Final Office Action was mailed. Ex. 1004, pp. 62. This Office Action rejected various claims in view of prior art and

indefiniteness issues, but several dependent claims were indicated to be allowable if rewritten in independent form. Ex. 1004, pp. 62-70.

38. On April 10, 2014, the Applicant amended the independent claims to correct the indefiniteness issues, and to add the requirement that the determined characteristic is reported to a source of the received signal, reciting language from allowable dependent claims 5 and 14. Ex. 1004, pp. 79-85.

39. On May 14, 2014, a Notice of Allowance was mailed, and on June 16, 2014, the Applicant filed an amendment making minors corrections to claims 1 and 2. Ex. 1004, pp. 88-92, 101-107. The ’008 Patent issued on July 29, 2014. Ex. 1001, cover; Ex. 1004, pp. 1, 118.

6. THE RELEVANT ART AND LEVEL OF ORDINARY SKILL IN THE RELEVANT ART

40. I understand that obviousness is determined from the vantage point of a person of ordinary skill in the relevant art at the time of the alleged invention (“POSITA”). The ’008 Patent is directed to monitoring signal quality in a television receiver, and I agree that this represents the relevant field of art. *See* Ex. 1001, Abstract. I understand that a person of ordinary skill in the art is one who is presumed to be aware of all pertinent art, thinks along conventional wisdom in the art, and is a person of ordinary creativity.

41. A person of ordinary skill in the art (a “POSITA”) at the time of the alleged invention would have had a degree in electrical engineering or a similar

discipline, and three-to-four years of experience working with television signal processing and communication systems. Additional education may substitute for professional experience and significant work experience may substitute for formal education.

42. Unless otherwise noted, my statements in this declaration regarding what a POSITA would have known, understood, appreciated, considered obvious, been motivated to do, etc., regarding prior art refer to what the POSITA would have known before the earliest claimed priority date of the ’008 Patent (which, as I discuss below, is September 8, 2011).

7. CLAIM CONSTRUCTION

43. I understand that my analysis requires an understanding of the scope of the claims of the ’008 Patent. I understand that claim terms subject to *inter partes* review, absent some other definition provided in the patent, are given their ordinary meaning to a person of ordinary skill in the art in light of the patent specification. Therefore, in my analyses given below, I have assumed that all claim terms are given their ordinary interpretation as would have been understood by a POSITA reading the patent specification as of the priority date.

44. I understand that some claim elements may be recited using so-called “means-plus-function” language, in which an element is recited as a means or step for performing a specified function without the recital of structure, material, or acts

in support thereof, and that such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

45. I believe that the claims in the '008 Patent recite sufficient structure, material, or acts in support of any element that is arguably means-plus-function.

46. Claim 11 of the '008 Patent recites "one or more circuits that are operable to:", and then recites "receive," "digitize," "select," and "concurrently output" functions. The '008 Patent describes the claim 11 functions as being performed by the receiver circuit 100, comprising front-end module 158, channelizer module 152, monitoring module 154, and data processing module 156. Ex. 1001, 3:5-10. The '008 Patent defines "circuits" and "circuitry" as "physical electronic components (i.e. hardware) and any software and/or firmware ("code") which may configure the hardware, be executed by the hardware, and/or otherwise be associated with the hardware." Ex. 1001, 2:21-25. The '008 Patent further defines "module" as "functions that can be implemented in hardware, software, firmware, or any combination of one or more thereof." Ex. 1001, 2:30-33. To the extent the "one or more circuits" is considered a means-plus-function term, I believe the corresponding structure in the '008 Patent comes from its definitions of "circuits" and "module," and that the corresponding structure would be physical electronic hardware components and associated software/firmware that carries out the recited functions. Ex. 1001, 2:21-25, 2:30-33, 2:57-4:6, 4:16-62, 6:19-7:2, Figs. 1B, 1C.

47. It is my understanding that the ’008 Patent was previously asserted in another lawsuit, *Entropic Comms., LLC v. Charter Comms., Inc.*, 2:22-CV-00125-JRG (E.D. Tex.), and in June 2023, the District Court entered an order interpreting certain claims of the ’008 Patent. Ex. 1020. In that order, the District Court determined the following claim constructions:

- In claim 1 of the ’008 Patent, the phrase “operable to” was construed to mean “configured to,” as this was agreed to by the parties. Ex. 1020, p. 30.
- In claim 1 of the ’008 Patent, the phrase “digitize a received signal spanning an entire television spectrum comprising a plurality of television channels” was construed as having its plain meaning, rejecting the defendant’s construction that the “received signal” must contain only television channels. Ex. 1020, pp. 30-33.
- In claim 1 of the ’008 Patent, the terms “signal monitor,” “data processor,” and “channelizer” were construed to have their plain meaning, rejecting the defendant’s construction that these must be separate pieces of hardware, configured to perform the functions the claim ascribes to the signal monitor, data processor, and channelizer, respectively. Ex. 1020, pp. 34-36.

I have considered these constructions in my opinions herein.

8. PRIORITY DATE OF THE '008 PATENT

48. As I noted above, I understand that the '008 Patent has a filing date of September 8, 2012, and that it claims priority to an earlier U.S. Provisional Application that was filed on September 8, 2011. Ex. 1001, cover; Ex. 1004, pp. 2-5, 7, 44-45. This is the earliest priority that the '008 Patent claims. *Id*.

9. OVERVIEW OF THE PRIOR ART

9.1 Cable and Satellite Television Networks

49. The origins of the cable and satellite television networks long predate the earliest claimed priority date of the '008 Patent. Ex. 1026, pp. 22-23. Cable television networks are entertainment distribution systems that allow consumers to access and enjoy various television channels. *Id*. A basic cable television network includes a headend that serves as the origination point for downstream signals in the cable network, trunk cables leading from the headend, distribution cables that connect to a trunk cable and distribute signals through a neighborhood, drop cables that connect a home to a distribution cable, and terminal equipment in the user's home. *Id.* These elements are generally illustrated in Figure 1.1 of Ex. 1026 below.

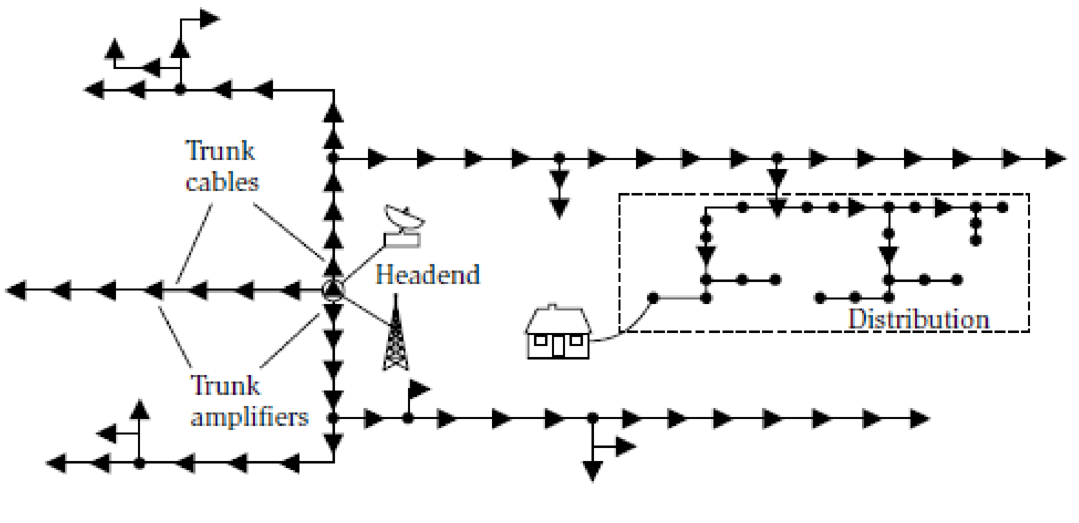


Figure 1.1 Tree-and-branch cable topology.

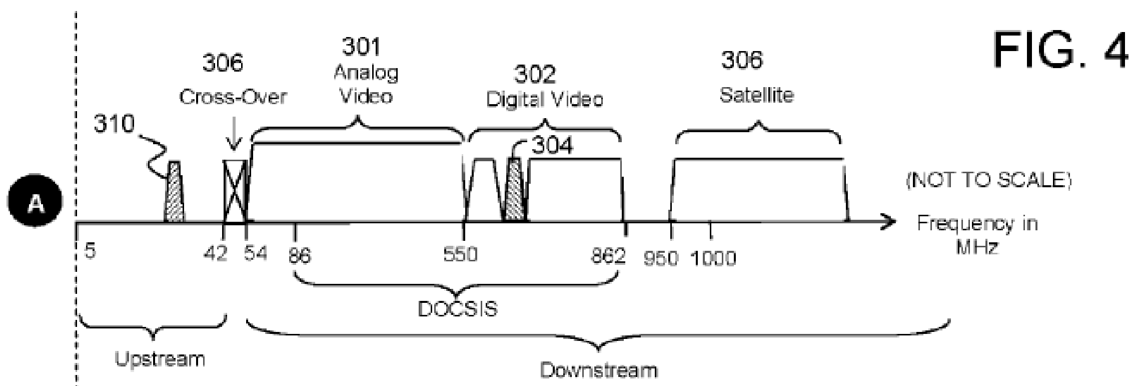
Ex. 1026, Fig. 1.1 (p. 34)

The headend is designed to broadcast and distribute, via coaxial cables, the data for the television channels as modulated radio frequency (RF) signals to multiple terminal equipment belonging to the consumers (e.g., television receivers, set-top boxes, data modems, digital video recorders, personal video recorders, and other terminal equipment). *Id.*, pp. 22, 30, 34, 40, 200-224, 467-469, 352. The transmissions between the headend and the terminal equipment are governed by various well-known industry standards, including Data Over Cable Systems Interface Specification (DOCSIS). Ex. 1026, pp. 27, 211-212.

50. In the 1990s, many cable networks began to be updated to use fiber optic cables, since fiber optic cables offer better performance than coaxial cables. Ex. 1026, pp. 37-38. As it is costly to dig up and replace cables, cable companies typically prioritized replacing the trunk cables with fiber, while leaving intact the

distribution coaxial cables that were in consumers' neighborhoods. Networks that use both fiber and coaxial cables are known as "hybrid fiber/coax networks," or "HFC" networks.

51. Consumers can also access television channels from satellites via conventional home satellite television systems. Ex. 1027, 1:30-31; Ex. 1028, [0006]. Such home satellite television systems typically include a fixed dish antenna that receives television channels in modulated RF signals, as well as a satellite receiver or set-top box designed to process and demodulate the modulated RF signals. Ex. 1027, 1:30-35; Ex. 1028, [0013]. Satellites may also be used to distribute the television channels to headends of cable television networks, which are then redistributed to the consumers. Ex. 1026, pp. 262, 280-282; Ex. 1028, [0009].



Ex. 1029, Fig. 4 (Excerpted)

52. Figure 4 of Exhibit 1029 (partially reproduced above) illustrates the RF spectrum usage on a cable network, as it is used to carry different types of upstream and downstream data. Ex. 1029, [0079]-[0080]. In North America, downstream

television channels from cable television networks occupy the RF spectrum from 54 to 864 MHz, with digital channels occupying the RF spectrum above 550 MHz. Ex. 1026, pp. 413, 503; Ex. 1029, [0079]-[0080]. Upstream channels on a cable television network occupy the lower frequency range from 5 to 42 MHz. Ex. 1029, [0080]. In 1941, the National Television System Committee, established by the United States Federal Communications Commission, set a standard that each television channel should be allocated 6 MHz of RF bandwidth and that the set of allocated television channels should occupy the RF spectrum in a contiguous manner. Ex. 1026, pp. 45, 413, 515-520.

9.2 Baseband and Modulation

53. Video and audio captured by a camera produces what is known as a "baseband" signal, and in order to transmit multiple video or audio signals on a common transmission line, different baseband signals may be modulated onto different carrier signals, to avoid interfering with one another. Ex. 1026, p. 58. Modulation generally entails starting with a carrier signal, and varying one of its characteristics (e.g., its frequency, amplitude, or phase), based on the information in the baseband signal, such that the baseband signal's data is impressed upon the carrier signal. *Id*. The act of "demodulation" refers to the reverse – taking a received carrier signal and recovering the data that had been impressed upon it.

9.3 Customer Demands for Signal Quality

54. Cable television customers expect good picture quality, and picture quality was commonly measured in terms of signal to noise ratio (SNR). Ex. 1026, pp. 82-83. As its name implies, SNR is a ratio of the strength of a desired signal to the amount of background noise. The ratio is typically expressed in decibels, and Table 2.1 from Ex. 1026, shown below, illustrates the degree to which customers objected to differing degrees of SNR due to different types of impairment:

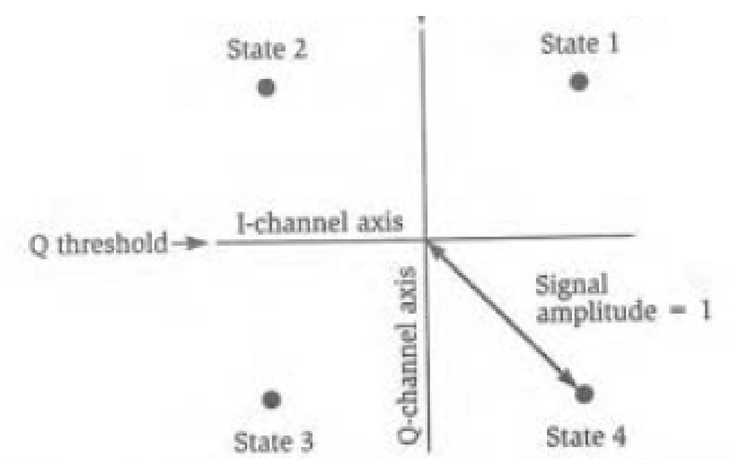
Table 2.1 Suppression of Impairments for Various Subjective Reactions

Impairment	*Imperceptible*	*Perceptible, but not annoying*	*Slightly annoying*	*Annoying*
Random noise	53 dB	48–51 dB	45 dB	40 dB
Phase noise		90 dB	85 dB	
CTB		50 dB	40 dB	30 dB
Chroma/luma delay			300 ns	400 ns

Ex. 1026, Table 2.1 (p. 82)

While SNR was a useful indicator for quality of analog signals, it was less so for digital signals because digital transmissions tended to have a flat power transmission level. Ex. 1026, p. 194. Accordingly, other metrics such as Bit Error Rate (BER) and Modulation Error Ratio (MER) were used to measure signal quality of digital signals. Ex. 1026, pp. 195-198. BER is simply the average number of bits that are received in error, divided by the total number of bits received. *Id.* MER is a bit more complicated, and will need a bit of understanding regarding how digital data is modulated. Digital cable television signals have traditionally been modulated

using Quadrature Phase Shift Keying (QPSK), also called 4-Quadrature Amplitude Modulation (QAM). Ex. 1026, pp. 163-166. In QAM, a single carrier frequency will actually have two channels that are 90° apart in phase (a.k.a. in quadrature) to avoid interfering with each other, and these two channels are called the "I" channel (in-phase) and the "Q" channel (quadrature). *Id*. A data value can be modulated onto the I channel, and another data value can be modulated onto the Q channel, and these values can then be mapped to a 2-dimensional graph (called a "constellation plot"), where the I channel data indicates a position on the X-axis, and the Q channel data indicates a position on the Y-axis, as illustrated in an excerpt of Figure 4.4 of Exhibit 1026 below:

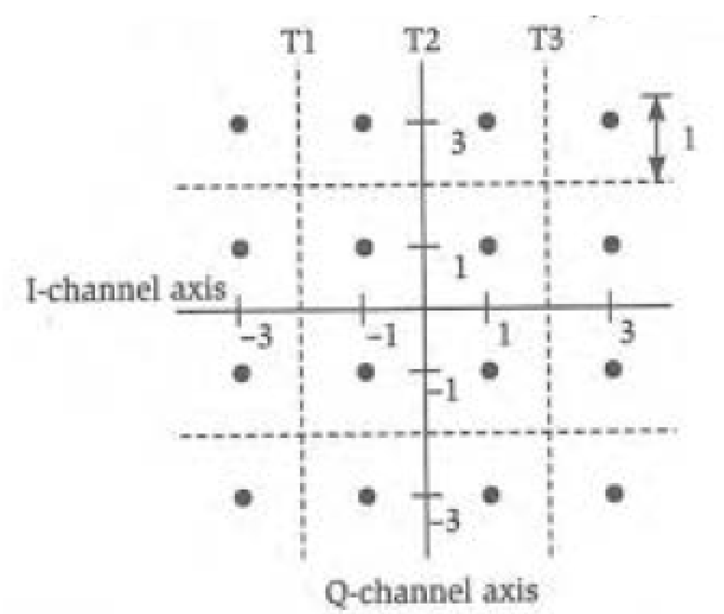


Ex. 1026, Fig. 4.4 (Excerpted, p. 164)

Id. In 4-QAM, each quadrant of the constellation plot is interpreted as a different state, and can represent two bits (e.g., a symbol in State 1's quadrant = "11", a symbol in State 2's quadrant = "01", a symbol in State 3's quadrant = "00", and a

symbol in State 4's quadrant = "10"). *Id.* So, for example, if a pair of I- and Q-channel data results in a symbol in the State 1 quadrant, then that will be interpreted as having a bit value of "11." Each time a pair of I- and Q-channel values is mapped to a position in the constellation plot, that will result in a symbol that indicates the corresponding bit value. *Id.*

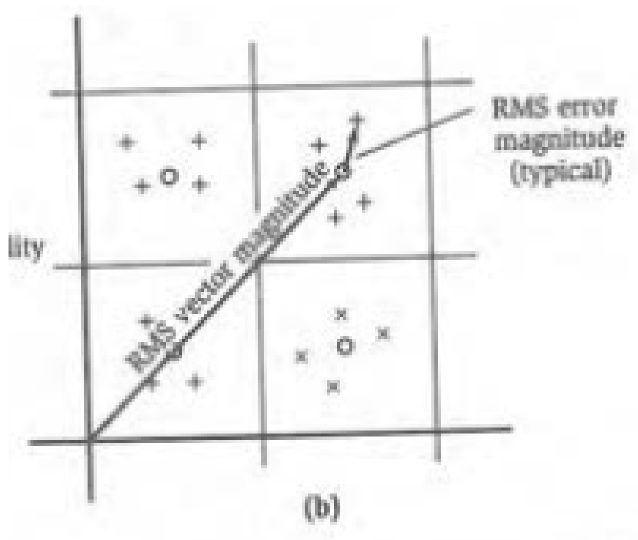
55. The above example divided the constellation plot into only 4 quadrants, resulting in an ability to transmit 2 bits per symbol. To fit more data, the constellation plot can be divided into even more sections. For example, Figure 4.5 of Exhibit 1026 (excerpted below) divides the constellation into sixteen (16) different sections and corresponding states:



Ex. 1026, Fig. 4.5 (Excerpted, p. 167)

The sixteen (16) possible states means each symbol can represent 4 bits of data (e.g., a symbol appearing in the section for State 1 = "0000", State 2 = "0001", … State 16 = "1111"). *Id.*, p. 167.

56. Returning to the discussion of MER, MER is based on how accurate the received symbols are, relative to their ideal positions in the constellation plot. *Id.*, pp. 196-197. For example, Figure 4.22(b) of Exhibit 1026, excerpted below, shows an example quadrant:



Ex. 1026, Fig. 4.22(b) (Excerpted, p. 196)

57. In this illustrated quadrant, the open circles represent the ideal symbol positions for a particular state (e.g., the exact center of the corresponding section), and the pluses ('+') indicate positions of received symbols (e.g., the X- and Y-positions based on the received I- and Q-channel signals). *Id.* The illustrated quadrant also shows two vectors: 1) an RMS vector to an ideal symbol position, and

2) an RMS error vector showing how far off the received symbol was from the ideal symbol position. *Id.* MER is a ratio of the magnitudes of these vectors. *Id.* SNR and MER are both ratios indicating the quality of a signal transmission, and the terms SNR and MER were often used interchangeably by POSITA, depending on whether analog or digital video was being addressed. For example, Exhibit 1024 is U.S. Patent Publication 2008/0089402 ("Massey"), which states that the MER is "an estimate of the signal to noise ratio (SNR) of the digital signal." Ex. 1024, [0051].

9.4 Kamieniecki - U.S. Publication No. 2005/0114879 (Ex. 1009)

58. U.S. Publication No. 2005/0114879 ("Kamieniecki") (Ex. 1009) was published on May 26, 2005, from U.S. Application No. 10/718,074, which was filed on November 20, 2003. As Kamieniecki was published more than one year before the September 8, 2011, priority date of the '008 Patent, Kamieniecki is prior art to the '008 Patent under pre-AIA 35 U.S.C. § 102(b). I understand Kamieniecki was not considered during the prosecution of the '008 Patent. Ex. 1001, cover.

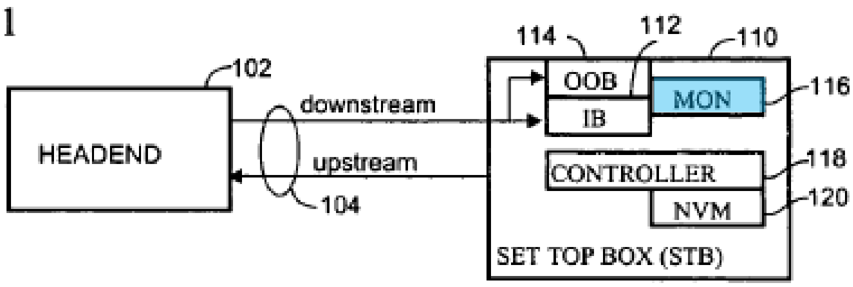
59. Entitled "Monitoring Signal Quality on a Cable Network," Kamieniecki identifies the same technical problem that the '008 Patent identifies – that signals in a cable network can become degraded by the time they reach the end user, and that it was important for service providers to monitor such signals at the end user's location, but it had previously been too expensive to do so. Ex. 1001, 1:34-45. Kamieniecki states the following:

> The signals transmitted over the cable network (e.g., coaxial cable, fiber optic cable, a combination of coax and fiber, or the like) to the users may be degraded by various factors, not the least of which is faulty equipment. It is therefore important for the service operator to monitor signal quality and channel health (the characteristics of one channel may be different than those of another channel). Typically, this is done with dedicated, expensive equipment at various nodes in the cable network, and therefore cannot detect problems which may be as far down the network as at the subscriber level.

Ex. 1009, [0005].

60. Kamieniecki offers the same solution that the '008 Patent offers – monitoring cable television network signal quality at the end user's location. Ex. 1001, 2:60-3:60; Ex. 1009, [0006]-[0009], [0013]-[0025]. Kamieniecki does this by placing a monitor 116 (**blue**) in a subscriber's set-top box (STB) 110, so that signal quality may be monitored at subscriber locations. Ex. 1009, [0007]-[0008], [0013]-[0017], Fig. 1.

FIG. 1



Ex. 1009, Fig. 1 (annotated)

61. Kamieniecki Figure 1 shows its general cable network architecture comprising a headend 102 communicating with a set-top box (STB) 110 via a cable

network 104. The headend 102 transmits downstream signals to the STB 110, and receives upstream signals from the STB 110. Ex. 1009, [0013]-[0014].

62. Kamieniecki describes the communications between the headend 102 and STB 110 as using channels that are either in-band (IB) or out-of-band (OOB). The IB channels are in the downstream direction, and carry content such as the audio, video, and other data of a television channel that the user is watching. Ex. 1009, [0002]-[0004], [0013]-[0014]. Kamieniecki describes basic STBs as having IB tuners for receiving analog or digital transmissions such as MPEG-2 transport streams and tables according to the Digital Video Broadcast (DVB) or Advanced Television Systems Committee (ATSC) standards. Ex. 1009, [0004].

63. In contrast with the downstream IB channels, Kamieniecki describes the OOB channels and a return path used to carry various kinds of information, such as for a STB to contact the headend when a user purchases a pay-per-view event; for interactive applications; or for sending program guide tuning data and other information to the STB. Ex. 1009, [0002]. Kamieniecki also notes that the cable return path can be used for reporting information back ("reportbacks") from the STB to the headend. Ex. 1009, [0002]-[0004].

64. Kamieniecki states that having the IB tuner 112 and OOB tuner 114 allows the STB 110 to simultaneously receive IB communications and OOB communications, and states that "[t]his means that subscribers can be tuned to a

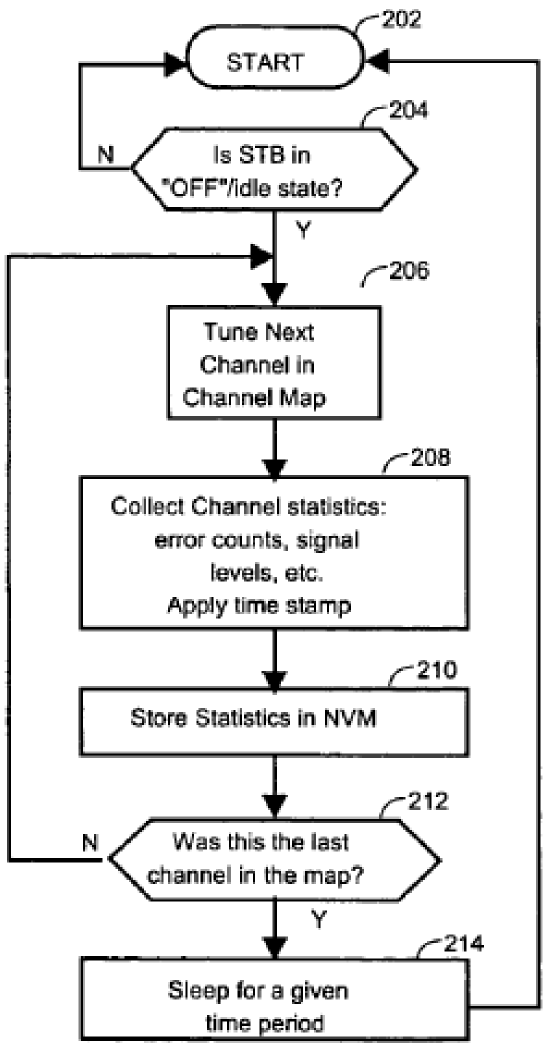
channel receiving audio and video content while, at the same time, the STB 110 is receiving instructions in an OOB channel." Ex. 1009, [0013]. Accordingly, Kamieniecki's STB 110 allows the user to watch a television channel being tuned by the IB tuner 112 while the STB 110 is also using the OOB tuner 114 to receive instructions.

65. Kamieniecki's monitor 116 gathers various types of information about signal quality of channels received by the STB 110. Ex. 1009, [0007], [00014]-[0016], [0018]-[0023]. Kamieniecki gives various examples of signal quality information, such as channel absence/presence, error count, signal level estimate, errors/dropouts on an OOB control channel, errors/dropouts on a forward/downstream transport channel (mainly consisting of video services), and verification of return path health by transmission of ack/nack (positive or negative acknowledgement messages) from the STB to the headend and back. Ex. 1009, [0007], [0014]-[0016], [0018]-[0023].

66. Kamieniecki describes a channel map identifying the IB and OOB channels that are available to the STB 110, and uses this channel map for its example monitoring process. Ex. 1009, [0013], [0015], [0017]. In that monitoring process (shown in Figure 2, reproduced below), Kamieniecki describes a loop in which the STB 110 tunes (step 206) to each channel in the channel map, gathers (step 208)

signal quality information and time stamps for that channel, and stores (step 210) the results in a memory. Ex. 1009, [0015]-[0017], [0022], Fig. 2:

FIG. 2



Ex. 1009, Fig. 2

67. Kamieniecki describes its looping process as providing coverage and health check for all channels, but Kamieniecki also notes that if desired, fewer than all channels may be monitored, and that in some embodiments only a single channel may be monitored. Ex. 1009, [0013], [0015]-[0017], [0027], Fig. 2.

68. Kamieniecki describes its looping process as handling one channel at a time, and this makes sense as the STB 110 is described as having only one IB tuner and only one OOB tuner. Ex. 1009, [0004], [0013]-[0017], Fig. 2. This would also be the reason why Kamieniecki's Figure 2 process begins with a determination (step 204) of whether the STB 110 is in an off/idle state – Kamieniecki allows its monitoring to occur automatically in the background so as not to disturb any viewer experiences, so waiting for an off/idle state helps avoid interfering with a viewer experience. Ex. 1009, [0014]-[0017], Fig. 2. For example, if the IB tuner 112 were being used to step through the various channels in the channel map to perform the monitoring, then IB tuner 112 would not be available if a user wanted to watch a particular television channel.

69. Kamieniecki also describes monitoring of upstream/reverse transport capabilities. In that example, the STB can transmit a "ping" type signal upstream to the headend, and the headend can respond by sending a return ping message to the STB via the OOB channel. That return ping message can contain signal quality statistics (e.g., signal level, error count, etc.) about the ping signal that the headend received from the STB 110, and the STB 110 can use the return ping message to verify functionality and record any appropriate signal statistics in its records. Ex. 1009, [0009], [0023].

70. Kamieniecki describes storing its signal quality information in a non-volatile memory 120 of the STB 110. Ex. 1009, [0007], [0013]-[0017]. This signal quality information can be reported by the STB 110 to the headend either as it is collected or when the STB is polled by the headend. Ex. 1009, [0008], [0014], [0016]-[0017], [0024].

9.5 Konstantinos - U.S. Publication No. 2010/0120386 (Ex. 1010)

71. U.S. Publication No. 2010/0120386 ("Konstantinos") (Ex. 1010) was published on May 13, 2010, from U.S. Application No. 12/269,302, which was filed on November 12, 2008. As Konstantinos was published more than one year before the September 8, 2011, priority date of the '008 Patent, Konstantinos is prior art to the '008 Patent under pre-AIA 35 U.S.C. § 102(b). I understand Konstantinos was not considered during the prosecution of the '008 Patent. Ex. 1001, cover.

72. Entitled "Multi-Channel Receiver Architecture and Reception Method," Konstantinos recognized that the market for data and television services was evolving, and that there was a growing need for receivers to have unrestricted multi-channel functionality to allow users to select many/any channels freely out of the full cable TV band. Ex. 1010, [0001], [0011], [0016].

73. As an example of this evolving market and demand for simultaneous channels, Konstantinos refers to the August 2006, issuance of version 3.0 of the "Data Over Cable Service Interface Specification (DOCSIS)" standard, and how this

standard would require the simultaneous reception of at least four channels. Ex. 1010, [0011]-[0012]. As a general note, DOCSIS is a standard that uses existing cable television networks to carry more than just television channels, and is the standard that allowed cable modems in the U.S. to access the Internet prior to the earliest priority date of the ’008 Patent.

74. Konstantinos notes that conventional approaches to multi-channel tuning would use multiple single-channel tuners in parallel, but that this approach faces limitations related to complexity and cost effectiveness, and becomes “completely impractical” as the number of simultaneously required streams/channels increases beyond two. Ex. 1010, [0006], [0008].

75. To address these demands of the evolving market, Konstantinos discloses a multi-channel receiver (MCR) 200, shown in its Figure 2 (reproduced below):

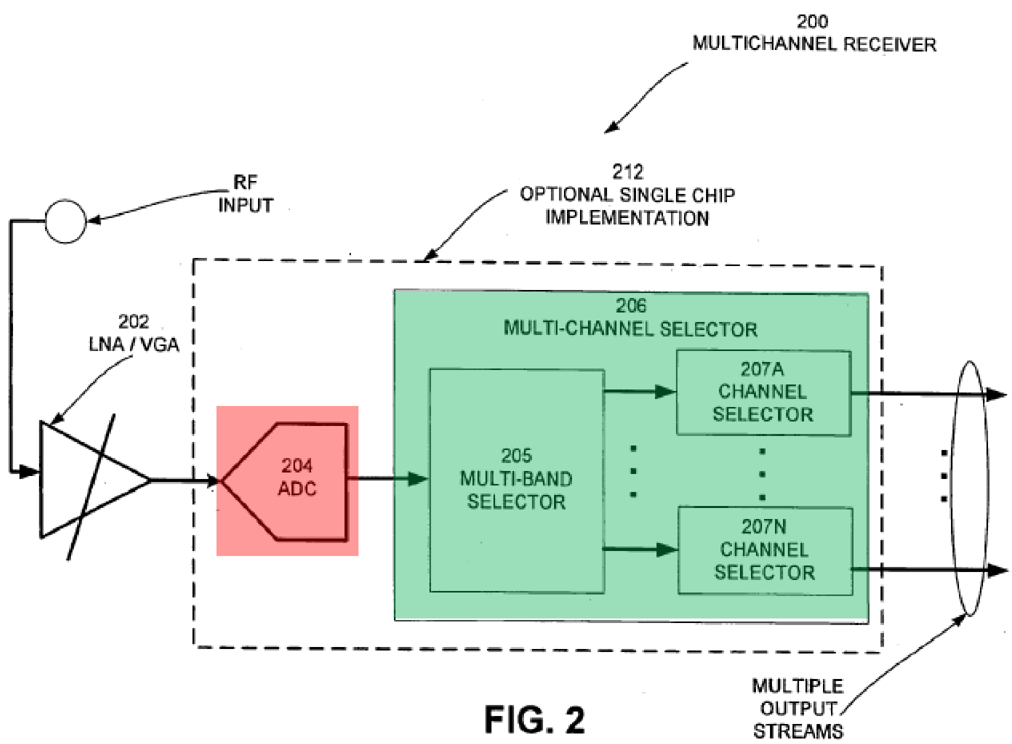


FIG. 2

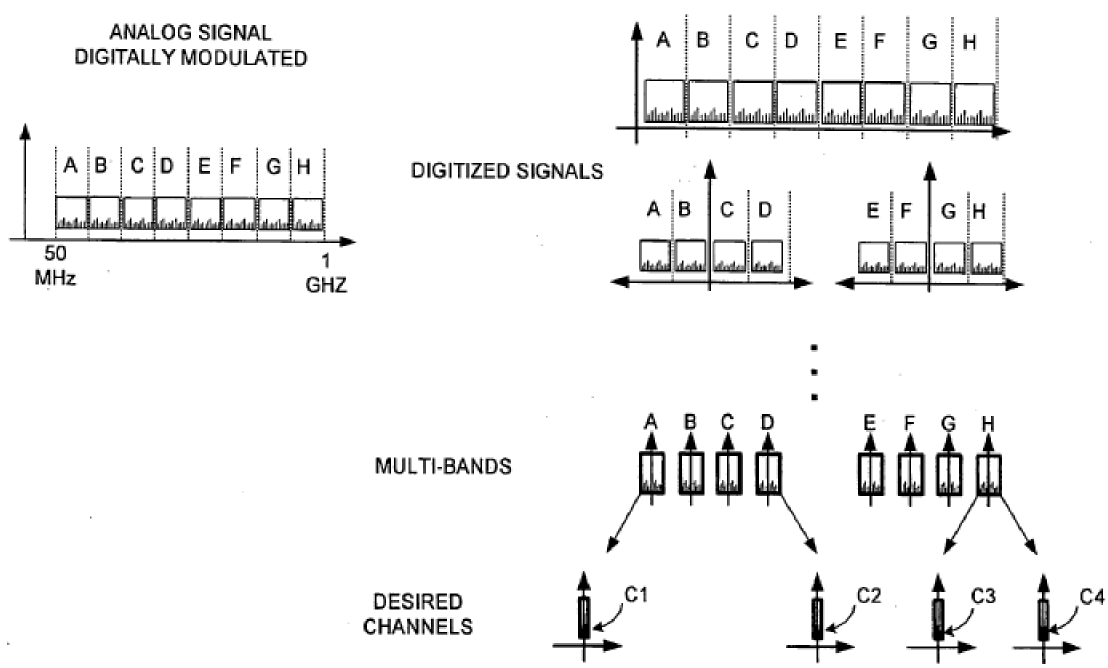
Ex. 1010, Fig. 2 (annotated)

76. The MCR 200 comprises a low-noise amplifier and variable gain amplifier (LNA/VGA) 202, which receives a "composite broadband RF input signal (e.g., a cable TV signal consisting of multiple channels bundled together between 50-1000 MHz)." Ex. 1010, [0043], [0114]-[0115]. The output of LNA/VGA 202 is "digitized in its entirety with an ADC [Analog-to-Digital Converter] 204" (**red**). Ex. 1010, [0043], [0116], Fig. 2. "The output of ADC 204 comprises a multi-channel digital signal," which may then be provided to a Multi-Channel Selector 206 (**green**), which selects channels of interest and outputs them as corresponding output streams. Ex. 1010, [0044]-[0046], [0117]-[0118]. As an example, Konstantinos'

multi-channel decoder may process and deliver 16 TV streams simultaneously. Ex. 1010, [0046], [0106], [0119].

77. The Konstantinos Multi-Channel Selector 206 (**green**) is illustrated as a two-part selector, with a Multi-Band Selector 205 and then multiple Channel Selectors 207A-N. Konstantinos refers to this as a two-step selection process, as described in more detail with reference to Figure 3 shown below:

FIG. 3



Ex. 1010, Fig. 3

The received RF input is shown on the left, and comprises composite broadband RF signal, having sub-bands A-H spanning the entire frequency range from 50 MHz to 1 GHz. Ex. 1010, [0048]. This RF signal is then digitized in its entirety by the ADC

204, creating a digital multi-channel signal that is a digital equivalent of the received RF signal, with digital equivalents of the sub-bands A-H and containing all of the channels that were in the original signal. Ex. 1010, [0043]-[0049], [0116].

78. Konstantinos' two-step selection process involves a "coarse" selection performed by the Multi-Band Selector 205, and then "fine" channel selection performed by the Channel Selectors 207A-N. Ex. 1010, [0043]-[0049], [0100]-[0102]. The first step, the coarse selection, is performed by the Multi-Band Selector 205, which splits the digital multi-channel signal from the ADC 204 into the sub-bands A-H. Ex. 1010, [0045], [0100]. This is shown as the "Multi-Bands" A-H, shown in Figure 3 as separate bands.

79. The second step, the fine selection, is performed by the Channel Selectors 207A-N, in which each Channel Selector 207 will select one channel and deliver it at its output stream. Ex. 1010, [0046], [0101]. Konstantinos states that the number of simultaneous channels that can be received will be determined by the number of channel selectors, and that by replicating the fine selector (Channel Selectors 207A-N), "one can realize a multiplicity of digital tuners very efficiently." Ex. 1010, [0043], [0105]. Konstantinos gives examples in which sixteen (16) channels are simultaneously selected, and does not indicate this is a limit. Ex. 1010, [0046], [0106].

80. The channels selected by the fine selectors (Channel Selectors 207A-N) are output as multiple output streams, as shown in Figure 2, and would be used however channels would be normally used (e.g., television channels may be viewed). Konstantinos notes that after channel selection, the channels may be sent to a channel decoding process using, for example, a multi-channel baseband processor or multi-channel channel decoder, and may be further processed by channel and source decoders. Ex. 1010, [0106]. Using its example of sixteen (16) channels, Konstantinos notes that 16 TV streams may be simultaneously delivered. Ex. 1010, [0106].

9.6 Renken - U.S. Patent No. 8,649,421 (Ex. 1011)

81. U.S. Patent No. 8,649,421 ("Renken") (Ex. 1011) issued on February 11, 2014, from U.S. Application No. 13/399,797, which was filed on February 17, 2012, and which claims priority to U.S. Provisional Application No. 61/444,611 (Exhibit 1012, "Renken Provisional"), filed on February 18, 2011. Ex. 1011, cover.

82. As I show further below in Section 9.6.1, it is my opinion that the Renken Provisional provides written description support for at least independent claims 1 and 10 of Renken, and provides written description support for the disclosure relied on herein. Thus, I understand that Renken constitutes prior art to the '008 Patent under pre-AIA 35 U.S.C. § 102(e) for at least the material included in the Renken Provisional, because its priority date (February 18, 2011) is before the

earliest priority date of the ’008 Patent (September 8, 2011). I also understand that neither Renken nor the Renken Provisional were considered during prosecution of the ’008 Patent. Ex. 1001, cover.

83. Entitled “Cable Modem for Network Measurements,” Renken addresses the same problem that the ’008 Patent addresses – monitoring signal degradation in a cable network. In particular, Renken discusses how noise and physical defects such as faulty equipment or corrosion can impair the performance of the cable network, and Renken teaches that it is important to monitor the performance of the cable network. Ex. 1011, 2:36-3:20, 4:4-17. Renken also notes that it was known to send a technician with a portable network tester to perform network measurements at customer premises, and to install dedicated end-of-line equipment for network monitoring, but that there remained a need for more economical approaches for performing network-wide monitoring. Ex. 1011, 3:21-4:17.

84. Renken also offers a similar solution as the one in the ’008 Patent – performing signal measurements at the end user’s location. Ex. 1011, 4:4-5:27. Renken notes that DOCSIS 3.0 introduced a concept of “channel bonding,” in which multiple independent channels are combined into one larger data stream, and that this calls for cable modems to be able to simultaneously receive at least 4 downstream channels and transmit on at least 4 upstream channels. Ex. 1011, 2:4-

35. Renken also expects that future cable modems will need to handle even more bonded downstream and upstream channels. Ex. 1011, 2:33-35. Accordingly, Renken notes that cable modems will have multiple receivers and transmitters, and that sometimes one or more of them will be idle, so Renken suggests using one or more idle receivers or transmitters to perform network measurements. Ex. 1011, 4:21-5:27. The Renken Provisional, entitled "Using Cable Modems for CATV Network Monitoring," includes a similar discussion - that DOCSIS 3.0 cable modems have the ability to bond multiple upstream and downstream channels; that future versions will increase this number of channels, and that idle receivers in such modems can be used for performing tests to measure the connection. Ex. 1012, p. 3, 2nd full paragraph[2] (e.g., "Subscriber data services do not need to use all the transmitters or receivers at all times. … These modems can perform these tests while continuing to provide data services for the subscriber with the remaining transmitters and receivers.").

85. Renken Figure 2 is a block diagram of an example of its measurement-capable cable modem (MCCM) 100:

[2] Note that the page citations refer to the superimposed exhibit page numbers, and not the original numbers appearing at the bottom of some of the pages.

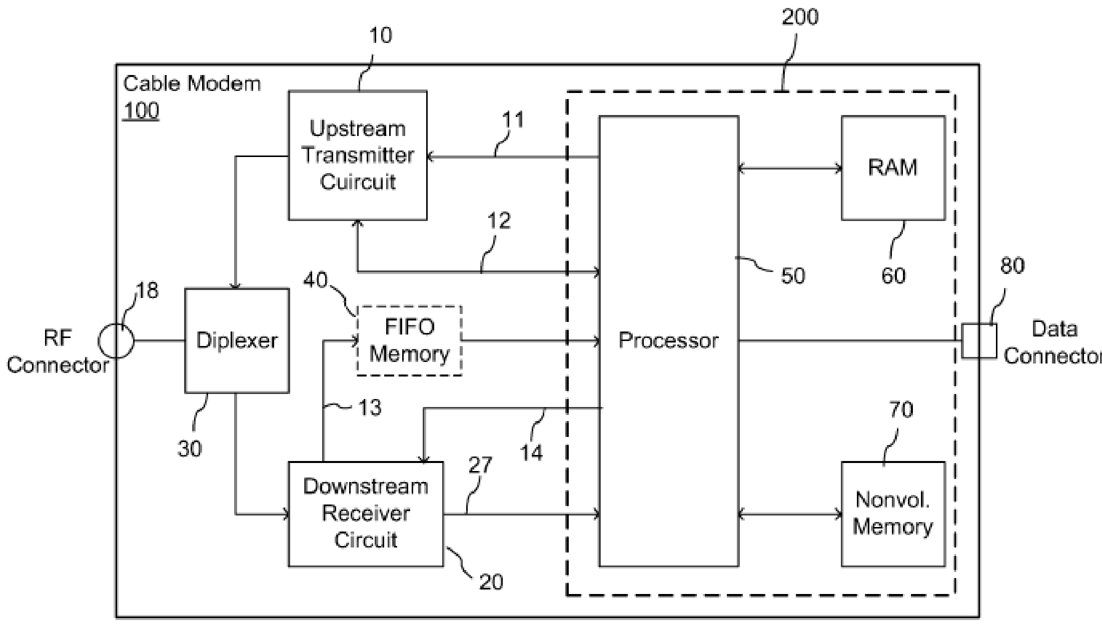


Fig. 2

Ex. 1011, Fig. 2

86. The MCCM 100 operates under the control of processor 50, executing a measurement program stored in non-volatile memory 70, and using RAM 60. Renken collectively labels the processor 50, non-volatile memory 70, and RAM 60 as a controller 200. The MCCM 100 also includes an upstream transmitter circuit 10 and downstream receiver circuit 20. Ex. 1011, 9:19-10:11, Fig. 2. The Renken Provisional shows the same elements in its Figure 1:

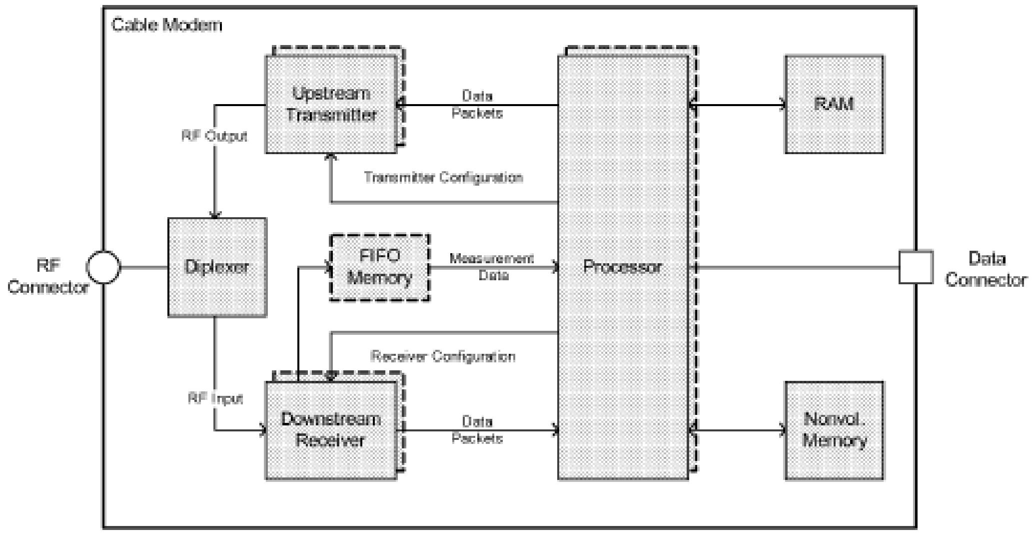


Fig. 1

Cable Modem Block Diagram Description

Ex. 1012, Fig. 1 (p. 5)[3]

87. The Renken Provisional also explains that the modem operates under control of the processor executing a measurement program in the non-volatile memory, and includes the upstream transmitter circuit and downstream transmitter circuit. Ex. 1012, pp. 3-6.

88. Renken Figure 3 shows an example of the downstream receiver circuit 20 in greater detail:

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[3] The Renken Provisional repeats its figure numbering, with "Fig. 1" appearing on page 5 and a different "Figure 1" appearing on 9 of Exhibit 1012.

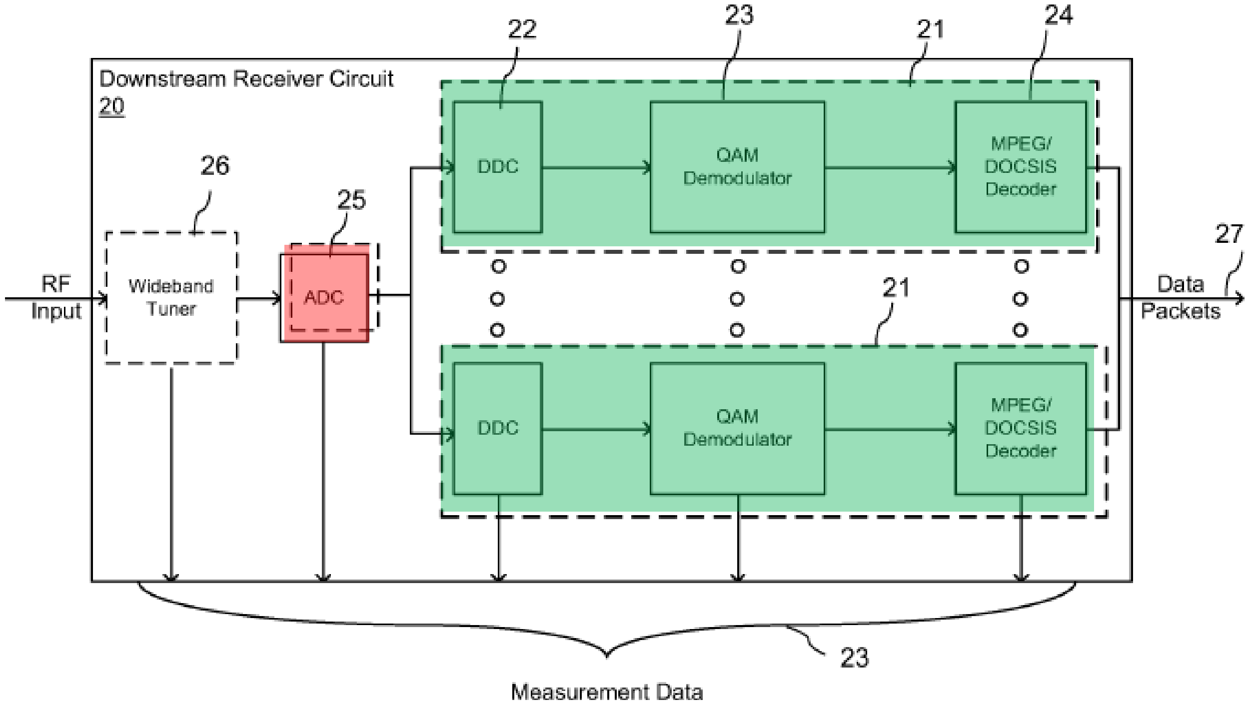


Fig. 3

Ex. 1011, Fig. 3 (annotated)

89. As illustrated, the downstream receiver circuit 20 includes a wideband tuner 26 for tuning to a selected group of downstream RF channels, an analog-to-digital converter (ADC) 25 (**red**) for converting the RF channels into digitized intermediate frequency (IF) signals, and a plurality of receivers 21 (**green**), each comprising a digital down converter 22, QAM demodulator 23, and MPEG/DOCSIS decoder 24, that are each capable of selecting, demodulating, and decoding a single downstream channel. Ex. 1011, 10:56-62, 11:22-32, 11:39-40, 12:22-13:21. Renken states that the receivers 21 may be used to perform measurements on DOCSIS channels as well as analog and digital TV channels. Ex. 1011, 11:12-18.

The Renken Provisional discloses the same features – it shows the downstream receiver circuit in its Figure 2, including the wideband tuner and ADC, as well as the DDC, QAM Demodulator, and MPEG/DOCSIS decoder that Renken labels as receivers 21. Ex. 1012, pp. 3-8. The Renken Provisional also states that the cable modem can make measurements for both DOCSIS and non-DOCSIS downstream channels, specifically including digital and analog television channels. Ex. 1012, pp. 7-8, 14.

90. Renken describes that the MCCM 100 may receive a request, from a central measurement controller (CMC) 7, to perform measurements using one or more idle receivers, and the MCCM 100 may send its measurement results back to the CMC 7. Ex. 1011, 9:5-18. The MCCM 100 may obtain, from its various components, various types of measurement data, such as spectrum-style measurements, signal level, carrier-to-noise ratio, frequency response and modulation error ratio. Ex. 1011, 11:39-12:5, 12:38-44, 12:56-67. Similarly, the Renken Provisional also describes the CMC controlling the MCCMs to perform its measurements, that the CMC monitors the measurement results from the MCCMs, that the CMC can query the measurement results from the RAM or non-volatile memory, and that the MCCM will send its measurement results to the CMC. Ex. 1012, pp. 3-4, 6, 10, 13 ("Upon measurement plan completion, the MCCM sends results to the CMC …"). The Renken Provisional also discusses the various kinds

of measurement data that the MCCM may obtain, including spectrum style measurements, signal level, carrier-to-noise ratio, frequency response and modulation error ratio. Ex. 1012, pp. 3-8, 14. Renken also includes signal-to-noise ratio, which for digital signals a POSITA would understand is used similarly to modulation error ratio. Ex. 1011, 12:63-13:5. A POSITA would understand that signal-to-noise ratio (SNR) was a typical measurement of the quality of an analog video signal, but for digital video signals, the corresponding measurement of quality is the modulation error ratio (MER), and that the terms SNR and MER were often used interchangeably, depending on whether analog or digital video was being addressed. For example, U.S. Patent Publication 2008/0089402, mentioned in Renken, states that MER is "an estimate of the signal to noise ratio (SNR) of the digital signal." Ex. 1011, 13:3; Ex. 1024, [0051]. Indeed, SNR has long been used as a measure of picture quality and customer satisfaction in cable television networks. Ex. 1026, p. 82.

9.6.1 Renken is Entitled to a Priority date of February 18, 2011

91. It is my understanding that a prior art patent or published application is entitled to claim the benefit of the filing date of an earlier-filed provisional application if the disclosure of the earlier-filed provisional application provides support for at least one claim in the patent or published application.

92. Accordingly, if Renken is to be treated as a prior art reference under pre-AIA 35 U.S.C. § 102(e) as of February 18, 2011, the filing date of the Renken Provisional, there will need to be at least one claim in Renken that is supported by the Renken Provisional. As I explain below, I believe that at least independent claims 1 and 10 of Renken are supported by the Renken Provisional. I walk through the elements in these claims below.

93. Renken claim 1 begins with a preamble stating the following "A measurement-capable cable modem (MCCM) comprising." Ex. 1011, claim 1. To the extent this preamble is considered limiting, the Renken Provisional describes its MCCM throughout the document. Ex. 1012, pp. 3-9, 13-14, Fig. 1 (p. 5), Fig. 2 (p. 6). For example, the MCCM acronym is introduced on the very first page of the specification (Ex. 1012, p. 3, 5th paragraph), and an example block diagram is illustrated in the figure appearing on page 5:

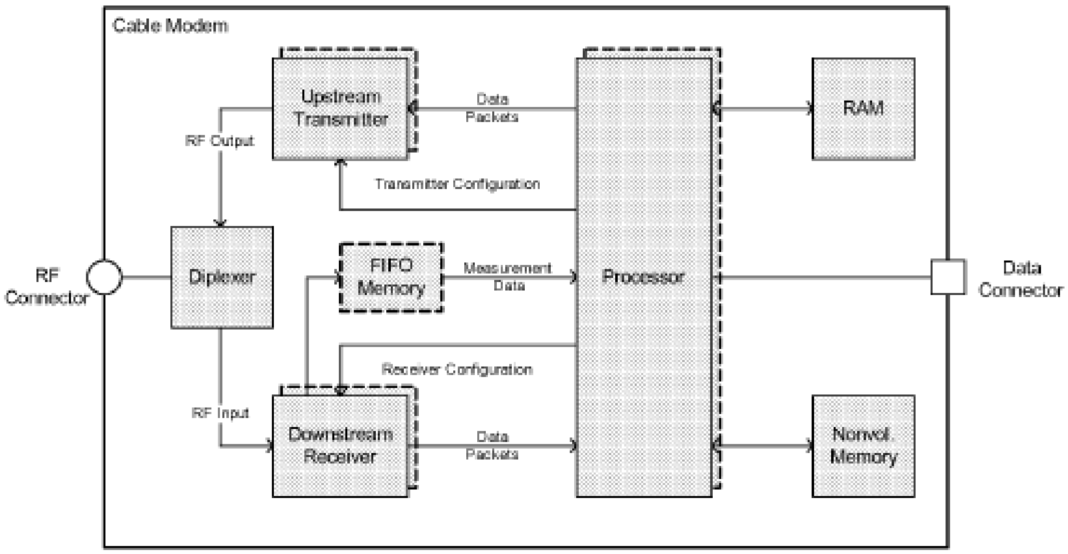


Fig. 1

Cable Modem Block Diagram Description

Ex. 1012, Fig. 1 (p. 5)

94. Renken claim 1 then recites "a cable port for connecting to a cable network." Ex. 1011, claim 1. This feature is shown in Figure 1 above as the "RF Connector" on the left-hand side of the figure. Ex. 1012, p. 5. Indeed, the title of the Renken Provisional refers to "CATV Network Monitoring," and its discussion of cable modems, headends, and associated network show that the RF connector is for connecting to a cable network. Ex. 1012, pp. 3-6, 9, 13-14.

95. Renken claim 1 then recites "a data port for connecting to a customer premises equipment (CPE) for providing customer services." Ex. 1011, claim 1. The "data port" is shown by the "Data Connector" on the right-hand side of Figure 1 above. Ex. 1012, p. 5. The Renken Provisional notes that its modem can perform its tests "while continuing to provide data services for the subscriber with the

remaining transmitters and receivers," and the "CPE" is the subscriber equipment used to receive those data services. Ex. 1012, pp. 3 (2nd paragraph), 4-5. A POSITA would understand that there necessarily must be a piece of equipment that uses those data services at the subscriber's location. For example, the Renken Provisional discusses DOCSIS connections as an example of the data services that customers use, and DOCSIS connections are necessarily used by a piece of equipment, such as a personal computer seeking to connect to the Internet. Ex. 1012, pp. 3-9, 13-15.

96. Renken claim 1 then recites "a plurality of transmitters coupled to the cable port for transmitting upstream digital communication signals from the CPE over one or more upstream channels of the cable network." Ex. 1011, claim 1. The Renken Provisional shows the Upstream Transmitters coupled to the RF Connector in Figure 1 above. Ex. 1012, p. 5. The Renken Provisional also discusses use of the upstream channels for subscriber data services. Ex. 1012, pp. 3-8.

97. Renken claim 1 then recites "a plurality of receivers coupled to the cable port for receiving downstream digital communication signals over one or more downstream channels of the cable network for communicating to the CPE." Ex. 1011, claim 1. The Renken Provisional shows the Downstream Receivers coupled to the RF Connector in Figure 1 above. Ex. 1012, p. 5. The Renken Provisional shows a more detailed diagram in Figure 2:

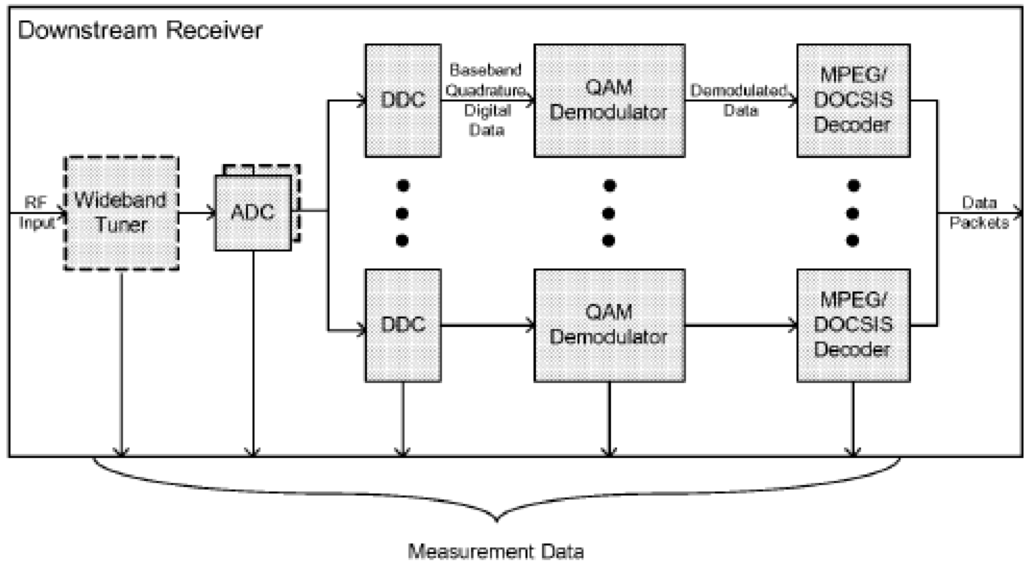


Fig. 2

Ex. 1012, Fig. 2 (p. 6)

The Renken Provisional also discusses use of the downstream channels for subscriber data services. Ex. 1012, pp. 3-8.

98. Renken claim 1 then recites "a modem controller coupled to the transmitters and the receivers for controlling thereof, wherein the modem controller is configured for tunably allocating at least one of the receivers and at least one of the transmitters for data communications between the cable network and the CPE, while leaving at least another one of the receivers as a currently idle receiver that is not allocated for the data communications, or leaving at least another one of the transmitters as a currently idle transmitter that is not allocated for the data communications." Ex. 1011, claim 1. The Renken Provisional shows the processor, RAM, and non-volatile memory, which Renken refers to as its controller 200, in Figure 1 appearing on page 5. Ex. 1012, pp. 3-8.

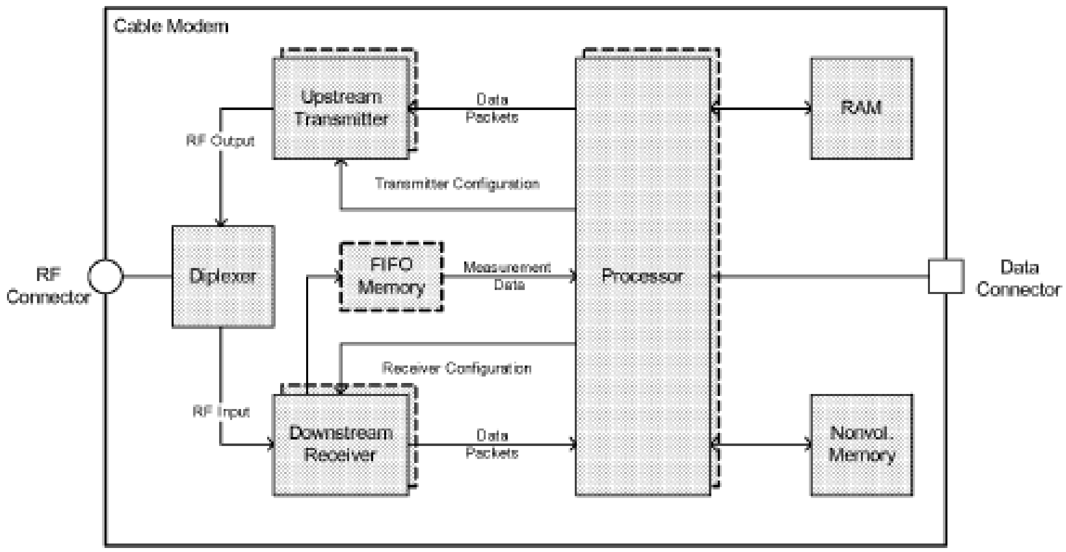


Fig. 1

Cable Modem Block Diagram Description

Ex. 1012, Fig. 1 (p. 5)

The Renken Provisional refers to the fact that DOCSIS 3.0 compliant cable modems will have multiple receivers and transmitters, and that "[s]ubscriber data services do not need to use all the transmitters or receivers at all times," so "[t]hese modems can perform these tests while continuing to provide data services for the subscriber with the remaining transmitters and receivers." Ex. 1012, p. 3. Accordingly, one receiver may be idle and used for measurements, while another receiver may be used for data communications for the subscriber data services, and this reflects the recited "tunably allocated." Additionally, the Renken Provisional discusses how certain receivers or transmitters can be excluded from DOCSIS channel bonding, and that would result in unused receivers or transmitters that can be used for performing measurements. Ex. 1012, p. 3 ("… the CMC communicates with the Cable Modem

Termination System (CMTS) to request that it exclude one or more receivers and/or transmitters from DOCSIS channel bonding. Then the CMC signals the MCCM via internet protocol messaging to perform specific measurements with the unused receivers and/or transmitters."). As for the "CPE," or customer-premises equipment, this simply reads on whatever user device that ultimately use the subscriber data services, such as the DOCSIS connections, discussed in the Renken Provisional. Ex. 1012, p. 3.

99. Renken claim 1 concludes with "wherein the modem controller further comprises a measurement controller for utilizing the currently idle receiver or the currently idle transmitter to perform a network measurement." Ex. 1011, claim 1. The Renken Provisional shows this "modem controller" in several ways. First, the Renken Provisional discloses a local measurement controller (LMC) which can locally control the MCCM to perform the various signal measurements. Ex. 1012, pp. 3, 6, 9-11, 13-15. Second, the Renken Provisional discloses the processor executing a measurement program to perform the various measurements, and the claimed modem controller can read on this processor with the measurement program. Ex. 1012, pp. 3, 5-6, 9-11, 13-15. As for the actual use of an idle receiver or transmitter to perform a network measurement, this is discussed throughout the Renken Provisional. Ex. 1012, pp. 3-15. For example, the Renken Provisional states that "subscriber modems are configured with software providing these extra

measurement capabilities," and that "[t]his invention consists of one or more of these measurement-capable cable modems (MCCM) being directed by remote control from a central measurement controller (CMC) or a local measurement controller (LMC) to perform a variety of signal-level measurements …" Ex. 1012, p. 3. The Renken Provisional gives a wide variety of examples of measurements, such as "[d]igital measurements such as Level, MER, Pre- and Post-Forward Error Correction (FEC) Bit Error Rate (BER), …" Ex. 1012, pp. 3-4. The Renken Provisional lists various examples in a measurement capability list, which the MCCM prepares based on its current capacity. Ex. 1012, pp. 9 (Fig. 1 - "CM builds measurement capability list and waits for further instruction"), 14-15.

100. The Renken Provisional also provides support for Renken independent claim 10. The preamble of that claim recites "[a] method for monitoring a cable network comprising a network node." Ex. 1011, claim 10. The Renken Provisional describes its CATV network monitoring method throughout, referring to a cable plant and CATV network. Ex. 1012, pp. 3-8. The Renken Provisional shows example monitoring flows. Ex. 1012, pp. 9-11. The Renken Provisional explains that a central measurement controller (CMC) may communicate with the MCCM via a cable modem termination system (CMTS), and the claimed "network node" would simply read on the location of that CMTS. Ex. 1012, pp. 3 (e.g. 5th paragraph), 5, 9, 13-15.

101. Renken claim 10 then recites "a cable modem termination system (CMTS) disposed at least in part at the network node." Ex. 1011, claim 10. The Renken Provisional discusses the CMTS. Ex. 1012, p. 3. Additionally, a POSITA would understand that a CMTS is simply a well-known part of a DOCSIS cable television network.

102. Renken claim 10 then recites "a cable modem (CM) disposed at a customer location for connecting to a customer premises equipment (CPE)." Ex. 1011, claim 10. This cable modem is supported by the discussion of the MCCM/cable modem found throughout the Renken Provisional. Ex. 1012, pp. 3-15. The Renken Provisional shows a block diagram of its cable modem in Figure 1 above. Ex. 1012, p. 5. To the extent the CPE is limiting in this claim, the Renken Provisional shows a Data Connector that would be connected to the user's equipment for using the DOCSIS connection. Ex. 1012, p. 5:

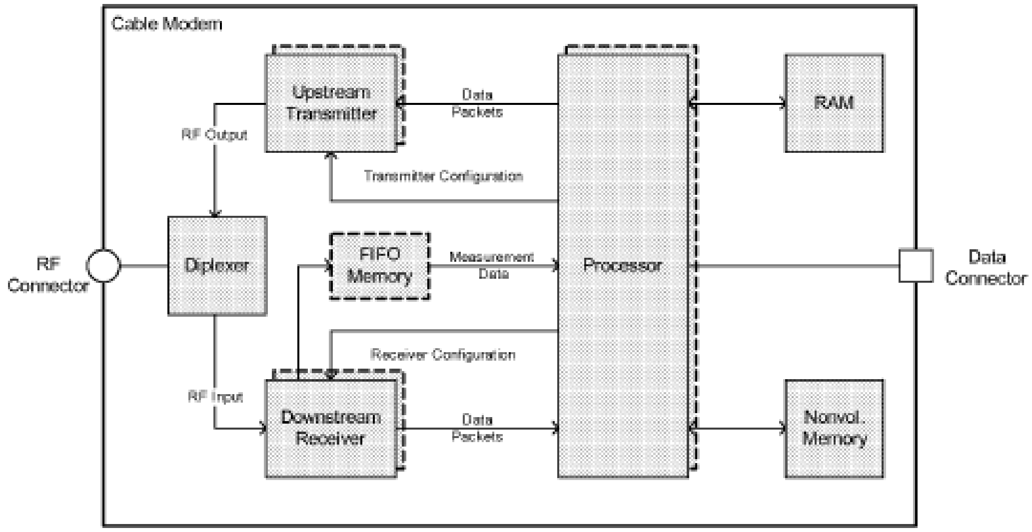


Fig. 1

Cable Modem Block Diagram Description

Ex. 1012, Fig. 1 (p. 5)

103. Renken claim 10 then recites "a cable link for connecting the CMTS to the CM for providing customer services." Ex. 1011, claim 10. This "cable link" is described as the "cable plant" in the Renken Provisional. Ex. 1012, p. 3 ("… digital quality measurements on any or all downstream channels of the cable plant …"). Indeed, the Renken Provisional refers to the "CATV Network" in its title, and the "network" variously throughout its disclosure, and these disclosures provide support for the claimed "cable link." Ex. 1012, pp. 2-4, 8, 9, 12-15. A POSITA would also have understood that cable television networks necessarily used cables to connect headends to cable subscribers.

104. Renken claim 10 then recites "wherein the CM comprises a plurality of receivers for receiving downstream data communication signals from the CMTS

over one or more downstream channels and a plurality of transmitters for transmitting upstream data communication signals over one or more upstream channels to the CMTS." Ex. 1011, claim 10. These "receivers" and "transmitters" are shown as discussed above with respect to the "receivers" and "transmitters" in claim 1.

105. Renken claim 10 then recites "the method comprising: a) allocating at least one of the receivers and at least one of the transmitters to data communications between the CMTS and the CPE, leaving at least another one receiver or at least another one transmitter as a currently idle receiver or transmitter, respectively, that is not allocated to the data communications." Ex. 1011, claim 10. This step of "allocating" is supported as discussed above with respect to the "tunably allocating" feature of claim 1.

106. Renken claim 10 concludes with "b) performing a network measurement using the currently idle receiver or the currently idle transmitter." Ex. 1011, claim 10. This measurement performance is supported as discussed above regarding the "modem controller" feature of claim 1, discussed above.

107. In view of the above, I believe that at least independent claims 1 and 10 of Renken are supported by the Renken Provisional, and I understand that this permits the Renken patent to be a prior art reference under pre-AIA 35 U.S.C. § 102(e) as of the February 18, 2011, filing date of the Renken Provisional.

9.7 Yu - U.S. Publication No. 2010/0303181 (Ex. 1016)

108. U.S. Publication No. 2010/0303181 ("Yu") (Ex. 1016) was published on December 2, 2010, from U.S. Application No. 12/500,361, which was filed on July 9, 2009. As Yu was filed and published before the September 8, 2011, priority date of the '008 Patent, Yu is prior art to the '008 Patent under at least pre-AIA 35 U.S.C. § 102 (a) and (e). I understand Yu was not considered during the prosecution of the '008 Patent. Ex. 1001, cover.

109. Entitled "Scalable Satellite Receiver System," Yu recognized that conventional satellite receivers were used for receiving television channels, and that some households wish to view multiple channels simultaneously, but having separate analog tuners would be costly. Ex. 1016, [0005]-[0006]. Yu offers a scalable satellite receiver system as a solution. Ex. 1016, [0007]-[0013], [0039]-[0043], [0058].

110. Yu's receiver includes a satellite antenna 110, a low-noise block converter 120, a downconverter 210, and a digital demodulator 220 which operate to receive analog satellite signals and process them into digital channels that can be output to a television. Ex. 1016, [0007]-[0013], [0039]-[0043], Fig. 2.

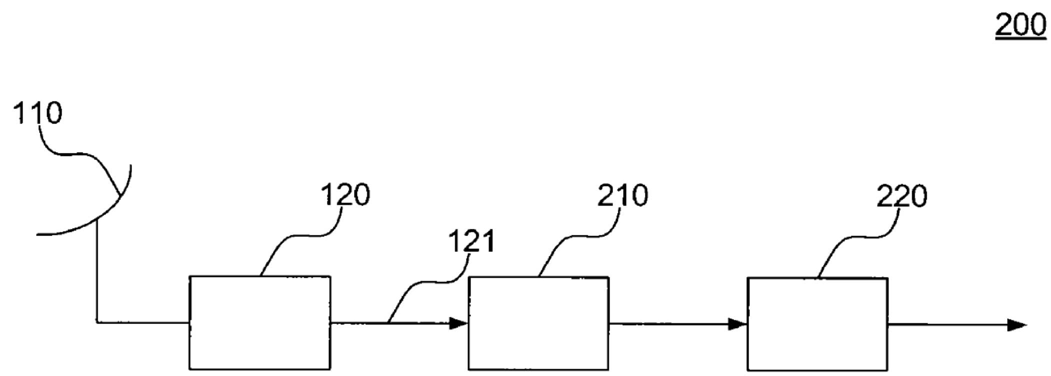


FIG. 2

Ex. 1016, Fig. 2

10. OPINIONS WITH RESPECT TO THE '008 PATENT

10.1 Grounds A-C: Claims 1-18 are Rendered Obvious by Kamieniecki in view of Konstantinos, Claims 7-8 and 15-16 are Rendered Obvious by Kamieniecki in view of Konstantinos and Yu, and Claims 9 and 17 are Rendered Obvious by Kamieniecki in view of Konstantinos and Cholas

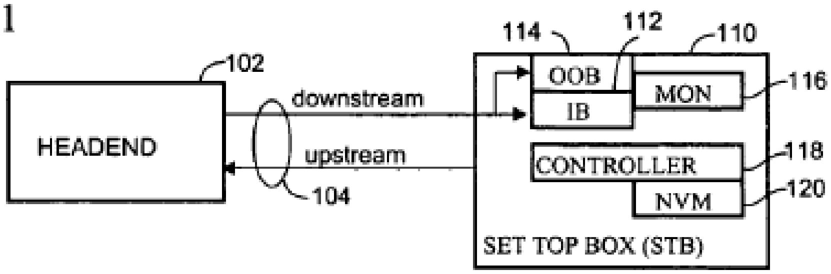
111. The following section provides a limitation by limitation analysis showing how Kamieniecki, in view of Konstantinos, renders claims 1-18 obvious. My discussion incorporates by reference the paragraphs regarding Kamieniecki, Konstantinos, and Yu above, and will offer specific details below. To help illustrate how the disclosures of these references map to the claim limitations, I have color coded some of my remarks and some figures in the noted art below. However, before addressing the limitations in detail, I will first offer a general discussion about the rationale for the combination of Kamieniecki and Konstantinos.

10.1.1 Rationale for the Combination

112. In general, I believe a POSITA would have considered it obvious to modify Kamieniecki's STB 110 to use the Konstantinos multi-channel receiver in place of its separate IB and OOB tuners, as this was a natural evolution of television technology, and is specifically taught by Konstantinos. Ex. 1009, [0007]-[0008], [0013]-[0017]; Ex. 1010, [0001], [0011], [0016].

113. Kamieniecki, filed in 2003, illustrates a STB 110 in Figure 1 (below) that has two separate tuners for receiving separate channels – an IB tuner 112 for in-band channels, and an OOB tuner 114 for out-of-band channels:

FIG. 1



Ex. 1009, Fig. 1

114. Kamieniecki states that the IB tuner 112 and OOB tuner 114 allow the STB 110 to simultaneously receive IB communications and OOB communications, and states that "[t]his means that subscribers can be tuned to a channel receiving audio and video content while, at the same time, the STB 110 is receiving instructions in an OOB channel." Ex. 1009, [0013].

115. In 2008, five years after Kamieniecki was filed, Konstantinos recognized that the evolving market for data and programming services will demand the capability of multi-channel tuning, and that the conventional approach of using multiple single-channel tuners in parallel becomes impractical as the number of simultaneously required channels increases beyond two. Ex. 1010, [0001], [0006], [0008], [0011], [0016]. Konstantinos further describes that the DOCSIS 3.0 standard, released in August of 2006, requires the simultaneous reception of at least 4 channels (e.g., for the transmission of Internet data) and that the full cable TV band can have up to 100 channels between 50-1000 MHz. Ex. 1010, [0011]. Konstantinos offers the solution of a single IC (integrated circuit) receiver able to provide improved multi-channel functionality. Ex. 1010, [0016]-[0017].

116. A POSITA would have recognized that Konstantinos suggests an improvement to systems like that of Kamieniecki, as Kamieniecki's separate tuners become impractical in view of the increased demand for multi-channel tuning. A POSITA would have recognized that using Konstantinos' multi-channel receiver in place of the Kamieniecki IB and OOB tuners would offer savings in terms of cost and component complexity. This would also address the growing need for multi-channel functionality, as identified in Konstantinos, as it would allow for the simultaneous reception of many channels. Ex. 1010, [0001], [0011], [0016]. Accordingly, it would have been obvious to a POSITA to use Konstantinos' multi-

channel receiver in place of the IB and OOB tuners in Kamieniecki's STB 110, as doing so merely combines prior art elements according to known methods to yield predictable results.

117. A POSITA would also have recognized that if Kamieniecki's STB 110 were updated to use the Konstantinos digital multi-channel receiver, the problem addressed by Kamieniecki's remote monitoring solution would still remain. Signals would still suffer degradation due to transmission distance and faulty equipment, and it would still be important, as stated in Kamieniecki, for service providers to monitor the signal quality and channel health of what their customers are receiving. Ex. 1009, [0005]. Accordingly, the modification of Kamieniecki's STB with Konstantinos' multi-channel receiver would not have removed the need for Kamieniecki's signal monitoring.

10.1.2 Independent Claim 1

118. As I explain below, it is my opinion that claim 1 of the '008 Patent would have been obvious to a POSITA in view of Kamieniecki combined with Konstantinos. The elements of claim 1 appear in the Claims Listing Appendix, labeled as elements [1A]-[1E], and I refer to these elements by their labels below.

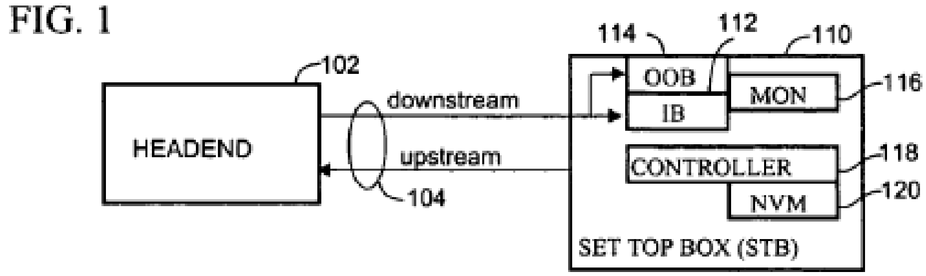
a. [1A]: "A system comprising:"

119. As I explain below, the combination of Kamieniecki and Konstantinos renders obvious the elements of the "system" claimed in the preamble of claim 1 of the '008 Patent.

b. [1B]: "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;"

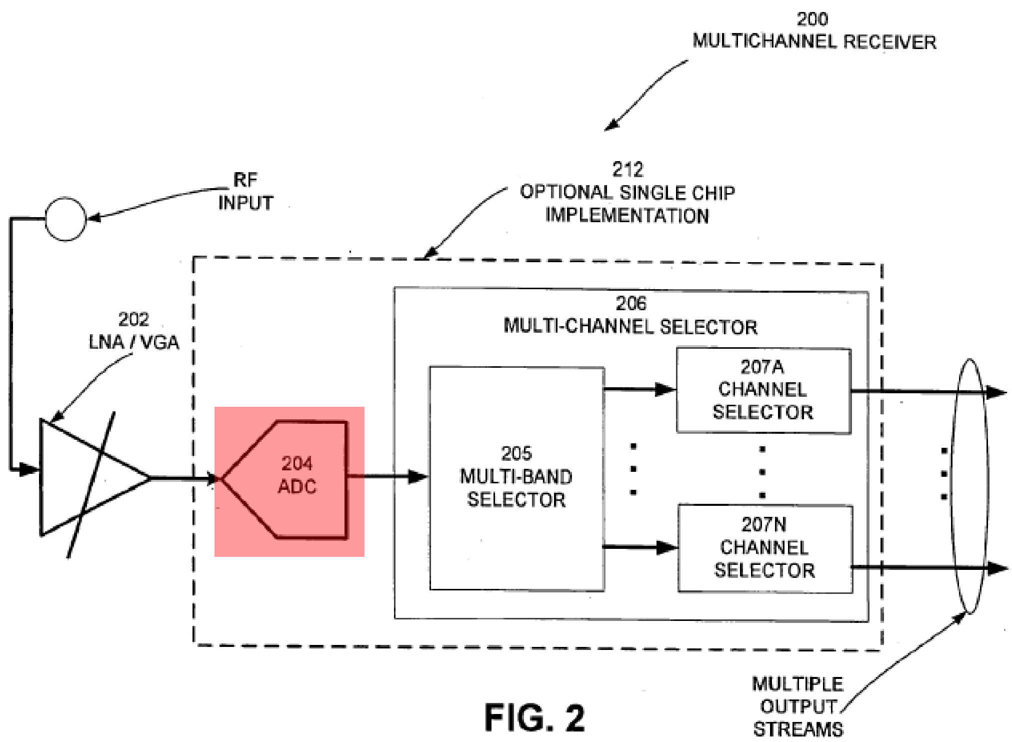
120. It is my opinion that Kamieniecki-Konstantinos discloses "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal," as claimed.

121. Kamieniecki describes headend 102 transmitting a plurality of IB channels and one or more OOB channels (together "a received signal spanning an entire television spectrum") that are received by STB 110. Ex. 1009, [0013], Fig. 1. The IB channels ("a plurality of television channels") include audio and video content of television programs for display at the STB. Ex. 1009, [0002]-[0004], [0013]-[0014].



Ex. 1009, Fig. 1

122. The "analog-to-digital converter" is found in the Konstantinos multi-channel receiver. Konstantinos describes an analog-to-digital converter 204 (**red**), which is part of the Konstantinos multi-channel receiver 200 shown in Figure 2 below. Ex. 1010, [0042]-[0046], [0114]-[0116], Figs. 2, 9.



Ex. 1010, Fig. 2 (annotated)

123. The RF input received by Konstantinos' multi-channel receiver 200 is supplied to a low-noise amplifier and variable gain amplifier (LNA/VGA) 202 before being digitized "in its entirety with an ADC 204." Ex. 1010, [0043]. Konstantinos states that this RF input may be a cable TV signal consisting of multiple channels bundled together between 50-1000 MHz, and that the digitization samples "the whole RF signal", such that no channel information is lost, to thereby allow "any combination of the available channels of the original composite signal" to be selected. Ex. 1010, [0043], [0048]-[0049], [0104]-[0105], [0114]-[0116]. The frequency range of cable TV channels (50-1000 MHz) digitized by Konstantinos' ADC spans virtually the same frequency range of the cable TV signals discussed in the '008 Patent. Ex. 1001, 4:11-13 (cable TV signals range between 55 MHz and 1002 MHz). Accordingly, the ADC 204 described by Konstantinos is an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels.

124. In the Kamieniecki-Konstantinos combination, the IB and OOB channels of Kamieniecki would be the RF Input that is received by the Konstantinos multi-channel receiver 200. The digitization of the IB and OOB channels of Kamieniecki by the ADC 204 results in a multi-channel digital signal ("digitized signal") that is a digitized equivalent of the input RF signal. Ex. 1010, [0043], [0048]-[0049], [0116]; Ex. 1009, [0013].

125. A POSITA would have been motivated to apply Konstantinos' teaching of a multi-channel receiver to the monitoring system of Kamieniecki in order to enable simultaneous tuning and monitoring of larger numbers of channels (e.g., four or more) as required by new cable technologies such as DOCSIS 3.0 and the advent of cable offerings with up to 100 TV channels. Ex. 1010, [0011]; Ex. 1009, [0017]. Having multiple channels be digitized simultaneously also provides a benefit to the viewer by allowing for faster channel switching with multiple decoders because there would be reduced delay while the tuner is switching to the new channel's frequency.

126. A POSITA would further have been motivated because Konstantinos' capture and digitization of the entire RF signal would provide the benefit of having a more efficient digital processing system by avoiding multiple individual tuners. A POSITA would have understood that the IB and OOB tuners of Kamieniecki would be replaced by Konstantinos' multi-channel receiver providing enhanced capabilities as well as reducing cost and complexity through a single chip solution. Ex. 1010, [0016], [0044]; Ex. 1009, [0013].

127. Combining Konstantinos with Kamieniecki would be merely using known techniques (a single chip multi-channel digital receiver) to improve similar devices (devices with multiple TV tuners) to yield a predictable result (converting a received RF signal into multiple digital outputs). A POSITA would have had the

skill to implement Konstantinos' teachings in the system of Kamieniecki because Kamieniecki's IB and OOB tuners use the same inputs (an RF signal) and same outputs (digital signal of the desired channels) as those of Konstantinos' multi-channel receiver chip. In particular, a POSITA would have known how to incorporate Konstantinos' ADC 204 and multi-channel selector 206 (in place of Kamieniecki's IB and OOB tuners) to receive Kamieniecki's downstream IB and OOB channels and output digital signals of the selected channels. A POSITA would thus have been able to implement Konstantinos' multi-channel receiver into Kamieniecki's STB with an expectation of success and without undue experimentation.

128. It is, therefore, my opinion that Kamieniecki-Konstantinos discloses "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal," as claimed.

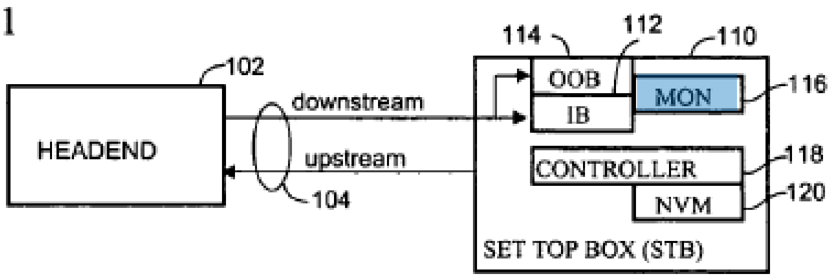
c. [1C]: "a signal monitor operable to: analyze said digitized signal to determine a characteristic of said digitized signal; and report said determined characteristic to a source of said received signal;"

129. It is my opinion that Kamieniecki-Konstantinos discloses "a signal monitor operable to: analyze said digitized signal to determine a characteristic of

said digitized signal; and report said determined characteristic to a source of said received signal," as claimed.

130. Kamieniecki describes a monitor 116 ("signal monitor") (**blue**), which monitors signal quality of the analog or digital channels it receives. Ex. 1009, [0004], [0006]-[0007], [0014]-[0016], [0024]. Monitor 116 analyzes the signal it receives from the IB and/or OOB tuners and determines signal quality information ("determine a characteristic of said digitized signal") such as "error count, signal level estimates, etc." Ex. 1009, [0007], [0014], [0022]. This monitor 116 (**blue**) is illustrated in Kamieniecki Figure 1:

FIG. 1



Ex. 1009, Fig. 1 (annotated)

131. In the combination with Konstantinos, the Kamieniecki monitor 116 would receive one or more selected IB and/or OOB channel(s) as a digital output stream (**orange**) from the Konstantinos receiver 200:

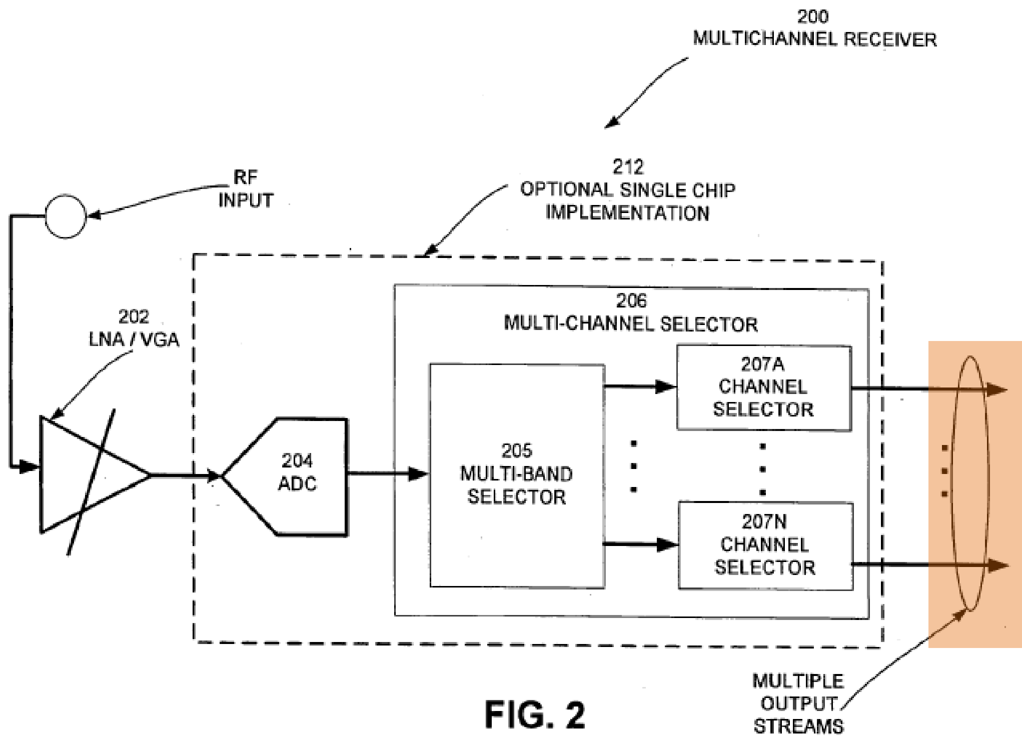


FIG. 2

Ex. 1010, Fig. 2 (annotated)

132. Kamieniecki further discloses that STB 110 will report signal quality information ("determined characteristic") to the headend 102 ("source of said received signal"). Ex. 1009, [0014] ("the information about signal quality can be transmitted by the STB to the headend …"), *see also* [0008], [0016]-[0017], [0024]. Indeed, a POSITA would have recognized that sending the results to the headend allows the headend to address problems and/or make adjustments as necessary.

133. It is, therefore, my opinion that Kamieniecki-Konstantinos discloses "a signal monitor operable to: analyze said digitized signal to determine a characteristic

of said digitized signal; and report said determined characteristic to a source of said received signal," as claimed.

d. [1D]: "a data processor operable to process a television channel to recover content carried on the television channel; and"

134. It is my opinion that Kamieniecki-Konstantinos discloses "a data processor operable to process a television channel to recover content carried on the television channel," as claimed.

135. Television channels need to be processed so that their content can be recovered and viewed. For example, a television channel typically contains audio and video, and there are various encoding standards for representing that audio and video in a digital format. An industry group, the Moving Picture Experts Group (MPEG), provides one such standard, and both Kamieniecki and Konstantinos refer to MPEG streams as examples of television streams. Ex. 1009, [0004]; Ex. 1010, [0107]. After an MPEG stream is received, it will need to be decoded ("processed") to recover the audio and video so that it can be displayed for a user. MPEG decoders were well-known to a POSITA, and would have been necessary for decoding the MPEG stream that Kamieniecki and Konstantinos describe. For example, U.S. Patent Publication No. 2004/0181813 ("Ota") generally describes a system in which multiple decoders may be used to support rapid channel changes, and makes

reference to having additional MPEG decoders for this purpose. Ex. 1015, [0026]-[0029].

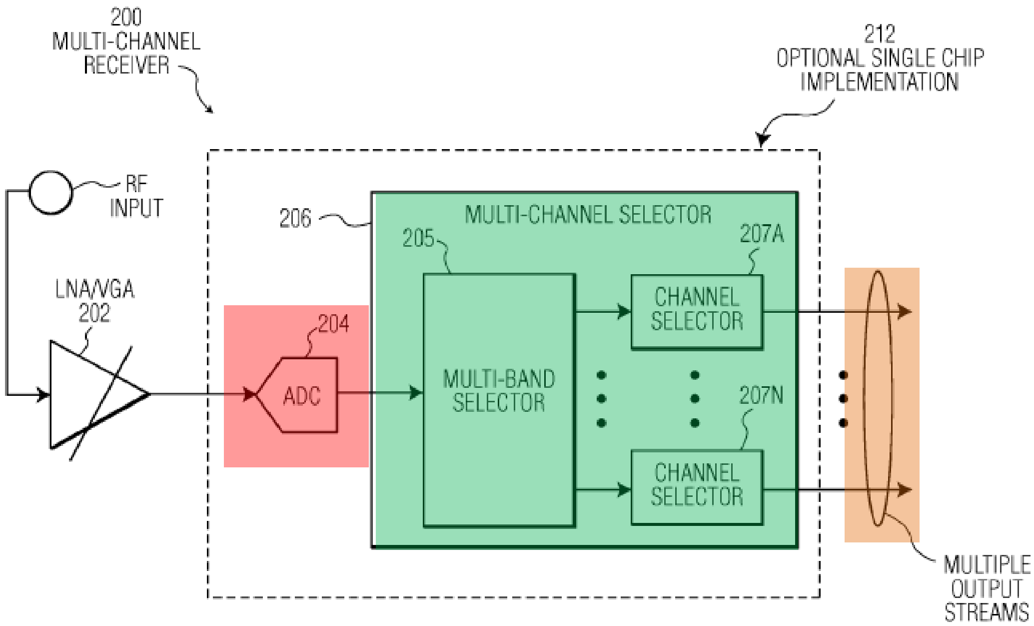
136. Kamieniecki describes that the IB channels include MPEG-2 transport streams which contain content of the television channel. Ex. 1009, [0004]. Kamieniecki's STB 110 would obviously have a decoder to decode the MPEG-2 stream ("recover content carried on the television channel") in order for the subscriber to view the content. Ex. 1009, [0013]. Konstantinos also describes channel and source decoders that are used to decode a TV channel, such as an MPEG stream, and recover its content for viewing by a user. Ex. 1010, [0030], [0042], [0106]-[0107], [0117]-[0119]. A POSITA would have known that such decoders would be data processors or would be implemented using data processors.

137. Therefore, it is my opinion that Kamieniecki-Konstantinos discloses "a data processor operable to process a television channel to recover content carried on the television channel," as claimed.

e. **[1E]: "a channelizer operable to: select a first portion of said digitized signal; select a second portion of said digitized signal; and concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor."**

138. It is my opinion that Kamieniecki-Konstantinos discloses "a channelizer operable to: select a first portion of said digitized signal; select a second portion of said digitized signal; and concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor," as claimed.

139. The Konstantinos multi-channel receiver 200 includes a multi-channel selector 206 (**green**) that selects various channels from the digitized signal from the ADC 204 (**red**), and outputs them concurrently as different output streams (**orange**):



Ex. 1010, Fig. 2 (annotated)

Ex. 1010, [0044]-[0046], [0117], Fig. 2.

140. Konstantinos describes its channel selector 206 as a two-step process, with reference to Figure 3:

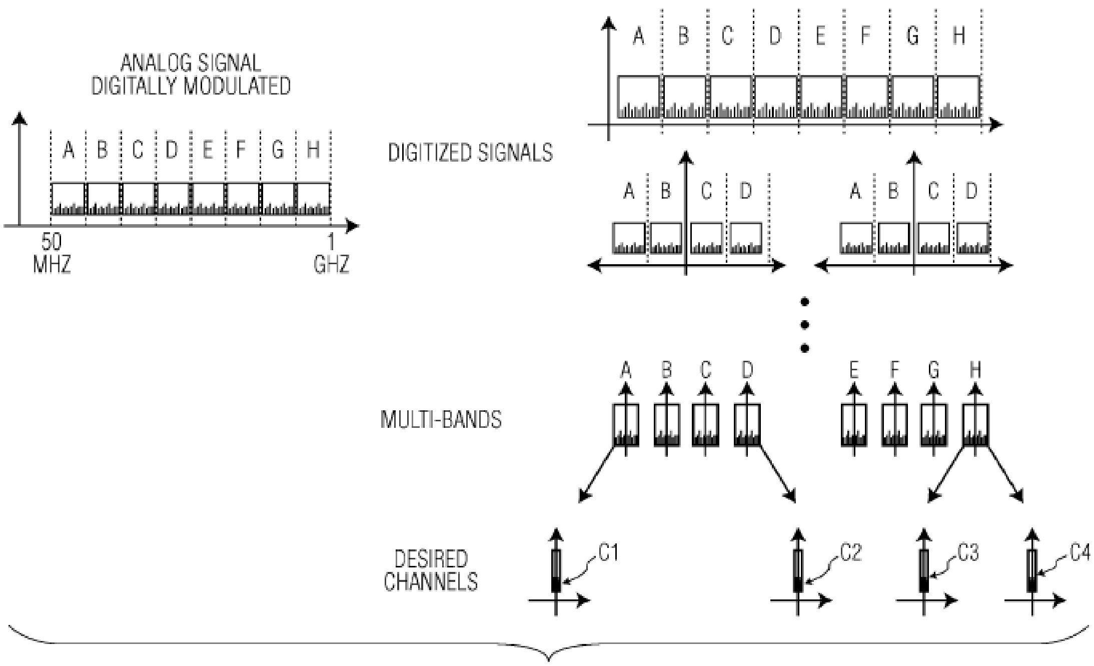


FIG. 3

Ex. 1010, Fig. 3

141. Figure 3 shows the original analog RF input spanning 50 MHz to 1 GHz and comprising frequency sub-bands A-H. Ex. 1010, [0045], [0048], Fig. 3. That entire signal, with all of the sub-bands A-H, is then digitized by the ADC 204, and the first stage of the channel selector 206 is handled by the multi-band selector 205, which performs a "coarse" selection of a "multi-band" subset of the sub-bands A-H. Ex. 1010, [0045], [0048], [0102]-[0104]. Figure 3 shows an example of this coarse cut, in which sub-bands A-D are selected as multi-bands.

142. This coarse selection can have overlapping sub-bands, as evidenced by the fact that the two multi-bands shown in Figure 3 both have the same sub-bands A-D in them. Ex. 1010, [0045], [0104]. Since the multi-band selector 205 is

working on digital versions of the RF input signal, those digital versions can be duplicated multiple times without loss of quality. Konstantinos notes that its coarse selection can be performed "without any information loss." Ex. 1010, [0045], [0104].

143. For the second step in its channel selection, each of the multi-bands selected by the coarse selection is then passed to a corresponding channel selector 207A-N for "fine" channel selection, to select and output a desired channel from the multi-band. Ex. 1010, [0046], [0105]. The Figure 3 example shows the result of four channel selectors 207, resulting in selecting and outputting four desired channels C1, C2, C3, C4. The Figure 3 example shows that multiple desired channels (e.g., C1 and C2) can be selected out of the same multi-band (e.g., sub-bands A-D), and that multiple desired channels (e.g., C3 and C4) can be selected out of the same sub-band (e.g., sub-band H). Konstantinos notes that the number of channel selectors 207A-N will determine the number of channels that can be simultaneously selected and output, and gives an example in which sixteen (16) channels in the original TV band are selected simultaneously. Ex. 1010, [0046], [0106]. Konstantinos also notes that by replicating the fine selectors, one can realize a multiplicity of digital tuners very efficiently. Ex. 1010, [0105]. From this, it would have been obvious to a POSITA that any number of channel selectors 207A…N may be implemented to output as many channels as is desired for simultaneous operation.

144. Accordingly, in the Kamieniecki-Konstantinos combination, the claimed "channelizer" is shown by the Konstantinos multi-channel selector 206.

145. As for the claimed "concurrently output" limitation, a POSITA would recognize that when the Konstantinos multi-channel receiver 200 is used with the Kamieniecki STB 110, Kamieniecki's measurements can be made without waiting for an idle time, and can be done in parallel so as to not disturb users. This is desirable, since Kamieniecki expressly states that it wishes to perform its monitoring "in the background" without disturbing user experiences. Ex. 1009, [0013], [0017]. It is also desirable to perform the monitoring at any time, without having to wait for the STB 110 to be idle, because network errors can occur at any time of the day – not just during the STB 110's idle periods – and a POSITA would have wanted to be able to make measurements at any desired time, even if the STB 110 happened to be in use. Kamieniecki described waiting until the STB 110 was idle before performing its monitoring, but this was only needed because Kamieniecki's STB 110 had only one IB tuner 112 and only one OOB tuner 114, and because Kamieniecki wished to avoid disturbing users. Ex. 1009, [0014]-[0017], Fig. 2. For example, if the IB tuner 112 were being used to step through the various channels in the channel map to perform the monitoring, then that IB tuner 112 would not be available if a user wanted to watch a particular television channel.

146. In the combination, since many channels can be simultaneously selected and output by the Konstantinos multichannel receiver 200, it would have been obvious to a POSITA to select one or more channels ("first portion of said digitized signal") to be output to the Kamieniecki monitor 116 for monitoring, and select one or more channels ("second portion of said digitized signal") to be output for normal usage, such as watching a television channel, thereby showing the "concurrently output" recited in element [1E]. Konstantinos also describes an interface circuit that would allow for outputs from the multi-channel selector to be sent to a monitoring unit that was not a component of Konstantinos' single chip implementation. Ex. 1010, [0121]. Konstantinos refers to outputting TV streams to be "further processed with channel and source decoders," and as discussed above regarding the "data processor," it would have been obvious to a POSITA that one or more channels would be output to a decoder to be watched as normal. Ex. 1010, [0106].

147. Therefore, it is my opinion that Kamieniecki-Konstantinos discloses "a channelizer operable to: select a first portion of said digitized signal; select a second portion of said digitized signal; and concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor," as claimed.

10.1.3 Dependent Claim 2

a. "The system of claim 1, wherein said first portion of said digitized signal spans said entire television spectrum."

148. It is my opinion that Kamieniecki-Konstantinos renders obvious "The system of claim 1, wherein said first portion of said digitized signal spans said entire television spectrum."

149. Kamieniecki discloses a desire to monitor all channels. Ex. 1009, [0008], [0013] ("The STB maintains a channel map which is a listing of all of the channels."), [0015] ("This provides coverage and health check for all of the channels."), [0017]. Kamieniecki's example algorithm monitors all channels when it is time for monitoring. Ex. 1009, [0015], [0022]. As discussed above regarding limitation [1E] and the description of Kamieniecki, Kamieniecki waits for an idle period because its STB 110 has only one IB tuner. The addition of the Konstantinos multi-channel receiver would eliminate the need for waiting for the tuner to be idle, and allow channels to be submitted to both the monitor 116 for monitoring and to a channel decoder for decoding and presentation to a user. A POSITA would have recognized the benefit of monitoring all of the channels (i.e., the entire television spectrum) at the same time so as to more quickly become aware of any issues with signal quality, rather than having to wait for one in-band tuner to be idle. Furthermore, although Kamieniecki loops through all of the channels in its channel map, there necessarily would be some time needed to tune to each of the channels,

and this would result in the measurements being at slightly different times. Using one or more of Konstantinos multi-channel receivers 200 to monitor all of the channels without impeding the user's television watching experience would provide a quicker and more accurate snapshot of the full spectrum conditions at any given point in time, and would not have been a difficult change to make, since Kamieniecki's STB already has separate IB and OOB tuners, allowing for the simultaneous reception of multiple channels. Ex. 1009, [0013], Fig. 1.

150. Accordingly, a POSITA would have known to implement sufficient channel selectors to allow for simultaneous monitoring of all channels in the received signal.

151. Therefore, it is my opinion that Kamieniecki-Konstantinos discloses "[t]he system of claim 1, wherein said first portion of said digitized signal spans said entire television spectrum," as claimed.

10.1.4 Independent Claim 3

a. [3A]: "A method comprising: performing by one or more circuits:"

152. It is my opinion that limitation [3A] is shown for the same reasons discussed above regarding limitation [1A].

b. [3B]: "receiving a signal having a bandwidth that spans from a first frequency, F_{lo}, to a second frequency, F_{hi}, wherein said signal carries a plurality of channels;"

153. Limitation [3B] is shown as discussed above regarding limitation [1B]. The claim does not specify values for the frequencies F_{lo} and F_{hi}, and the specification of the '008 Patent states that the example it gives (F_{lo} ≈55 MHz, F_{hi} ≈1002 MHz) is merely for illustration and is "not intended to be limiting." Ex. 1001, 4:11-15. Accordingly, the claimed F_{lo} and F_{hi} equally apply to the 50 MHz and 1000 MHz frequencies described in Konstantinos, or the high/low frequencies in the sixteen-channel example that Konstantinos also describes, as discussed above regarding limitation [1B].

154. Therefore, it is my opinion that Kamieniecki-Konstantinos discloses limitation [3B].

c. [3C]: "digitizing said received signal from F_{lo} to F_{hi} to generate a digitized signal;"

155. It is my opinion that limitation [3C] is shown for the same reasons discussed above regarding limitation [1B] in view of the discussion of limitation [3B].

d. **[3D]: "selecting a first portion of said digitized signal; selecting a second portion of said digitized signal; and concurrently outputting said selected first portion and said selected second portion,"**

156. It is my opinion that limitation [3D] is shown for the same reasons discussed above regarding limitation [1E].

e. **[3E]: "wherein: said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which reports said determined one or more characteristics to a source of said received signal;"**

157. It is my opinion that limitation [3E] is shown for the same reasons discussed above regarding limitations [1C] and [1E].

f. **[3F]: "and said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels."**

158. It is my opinion that limitation [3F] is shown for the same reasons discussed above regarding limitations [1D] and [1E], and that in view of the above, claim 3 is rendered obvious by Kamieniecki-Konstantinos.

10.1.5 Dependent Claim 4

a. "The method of claim 3, wherein said first portion comprises all of said received signal from F_{lo} to F_{hi}."

159. It is my opinion that claim 4 is shown for the same reasons discussed above regarding claim 2 and Limitation [3B]. Since the claim does not specify actual values for F_{lo} to $F_{hi,}$ this would read on the upper and lower bounds of the "entire television spectrum discussed in claim 2 above. Accordingly, it is my opinion that claim 4 is rendered obvious by Kamieniecki-Konstantinos.

10.1.6 Dependent Claim 5

a. "The method of claim 3, wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate."

160. Kamieniecki's monitor 116 monitors various signal quality characteristics. Monitor 116 monitors "signal level" for a channel (i.e., frequency), and a POSITA would have understood that this "level" refers to, or at least includes, the signal's power, and this is an example of "signal power vs. frequency." Ex. 1009, [0007], [0014]-[0015], [0018]-[0022].

161. Kamieniecki also discloses that its monitor 116 can monitor for the "absence/presence" of a particular channel. Ex. 1009, [0014], [0022]. A POSITA would have known that in order for a channel to be present, its signal power needs

to be strong enough to be detected and thus is another example of "signal power vs. frequency," as it would indicate which channel(s) were strong enough to be detected (or too weak to be detected).

162. Kamieniecki further discloses monitoring error count which a POSITA would have understood to include bit error rate and/or symbol error rate, as those were two well-known examples of errors. Ex. 1009, [0007], [0014]-[0015]. For example, Konstantinos discloses monitoring various signal characteristics using an information extraction processor, including Bit-Error-Rate (BER) and Signal-to-Noise Ratio (SNR), and acknowledges that this information can be used to improve reception quality. Ex. 1010, [0109]. A POSITA would also have known that in order to calculate signal-to-noise ratio, the noise level of the signal must be measured, since the signal-to-noise ratio for a channel refers to a ratio between the strength of the signal on that channel and the amount of noise on that channel. A POSITA would also have recognized that each of these are common ways of measuring signal quality and that they could similarly be implemented in Kamieniecki's monitor 116. The POSITA would recognize that there are many ways to evaluate the quality of a signal, and that the more characteristics are evaluated, the better evaluation one will have about a signal's quality. The various characteristics listed in the claim and in the references, are recognized as being similar for the purposes of evaluating a signal's quality, and that using one

characteristic instead of, or in addition to, another characteristic would be done without undue effort to achieve the same, predictable result of evaluating a signal's quality.

163. Therefore, it is my opinion that claim 5 is rendered obvious by Kamieniecki-Konstantinos.

10.1.7 Dependent Claim 6

a. "The method of claim 3 wherein: said received signal is a cable television signal; and said plurality of channels comprises a plurality of television channels."

164. Kamieniecki states that it is for monitoring quality of signals on a cable television network or the like, and describes television programming as an example of the services that its cable service operator provides on its transmitted channels. Ex. 1009, [0001], [0013]. Konstantinos also describes its multi-channel receiver 200 as receiving cable television channels. Ex. 1010, [0043] ("A composite broadband RF input signal (e.g., a cable TV signal consisting of multiple channels bundled together between 50-1000 MHz) …"). Accordingly, in the Kamieniecki-Konstantinos combination, the input RF signal would have at least included a cable television signal comprising a plurality of television channels.

165. Therefore, it is my opinion that claim 6 is rendered obvious by Kamieniecki-Konstantinos.

10.1.8 Dependent Claim 7

a. **"The method of claim 3, wherein: said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels."**

166. As discussed above regarding claim 6, the Kamieniecki-Konstantinos combination transmits a plurality of television channels. Kamieniecki does not refer to satellites, but states that its system is for monitoring quality of signals on a cable television network "or the like." Ex. 1009, [0001]. A POSITA would have considered satellite television service providers to be an obvious example of what Kamieniecki refers to when it says "or the like." The signal degradation problem described in Kamieniecki and addressed by its monitor 116 is not limited to cable television and its plurality of television channels, and would have existed for other forms of delivery just as well. Satellite television service providers were a well-known alternative to cable television before the priority date of the '008 Patent, and satellite transmissions, like all transmissions, can suffer signal degradation as well.

167. A POSITA would have considered it obvious to modify the Kamieniecki-Konstantinos combination so that the downstream signals arrive via satellite instead of cable. Doing so would have been the use of a known technique (monitoring and reporting of television signal quality, as taught by Kamieniecki-Konstantinos) to improve similar technologies (satellite television signals) in the

same way, and also would have been a simple substitution of known alternatives (satellite television for cable television). Furthermore, the need for simultaneous reception of television channels, as described in Konstantinos, is also not limited to cable television, and a POSITA would have recognized that it applied to satellite television subscribers as well. For example, if a household wanted to receive the 16 simultaneous TV channels that Konstantinos describes, that need existed regardless of whether the household subscribed to cable or satellite for its television service. Ex. 1010, [0008], [0046], [0106]. Furthermore, if the Kamieniecki-Konstantinos combination were used in a satellite television system, a POSITA would have known that a low noise block converter is a common part of satellite television systems.

168. To the extent Kamieniecki-Konstantinos does not suggest its use in a satellite system, Yu would have suggested to do so, as Yu recognized that satellite television subscribers wished to view and record multiple programs simultaneously, and offered a multi-channel satellite receiver for this purpose. Ex. 1016, [0005], [0007]-[0013], [0039]-[0043], [0058]. Yu also discloses that satellite television receiver systems included a low noise block converter. Ex. 1016, [0010], [0039]-[0040].

169. A POSITA would have considered it obvious to modify the Kamieniecki-Konstantinos monitoring system such that the downstream signals in Kamieniecki, and the RF input in Konstantinos, arrive via a satellite transmission

(as in Yu) instead of a cable. This would have addressed the need for simultaneous satellite TV channel reception (as recognized by Yu), and would have provided Yu with the ability, as described in Kamieniecki, to monitor signal quality and diagnose problems with the satellite signals. Ex. 1009, [0006]-[0007]. A POSITA would have understood that satellite television was a well-known alternative to cable television, and satellite customers, like cable customers, also wish to have good quality in their television channels.

170. A POSITA would have understood that modifying Kamieniecki-Konstantinos in view of Yu would have been a simple substitution of one known element (the cable downstream signals of Kamieniecki/Konstantinos) for another (the satellite downstream signals of Yu) to obtain predictable results (monitoring signal quality for a multi-receiver satellite television system). A POSITA would have had the skill to implement this change because it would merely require swapping one type of known television signal equipment (the cable television equipment in Kamienieck/Konstantinos) with another type of known television signal equipment (the satellite equipment in Yu). A POSITA would have been able to make this change without undue experimentation, as both types of television signal equipment were well known.

171. While Yu does not describe a return path to the source of its received signals (and it would be impractical for satellite television subscribers to send signals

back via satellite), Kamieniecki notes that a telephone modem may be used to report back signal quality measurements if a cable return path is not available. Ex. 1009, [0027]. A POSITA would have found it obvious to use Kamieniecki's telephone modem for reporting back signal quality measurements, if the cable connection were swapped for a satellite one.

172. Accordingly, it is my opinion that claim 7 is rendered obvious by Kamieniecki-Konstantinos, and also by Kamieniecki-Konstantinos-Yu.

10.1.9 Dependent Claim 8

a. "The method of claim 7, wherein said one or more circuits reside in a customer premises satellite reception assembly."

173. As discussed above regarding claim 7, it is my opinion that Kamieniecki-Konstantinos and Kamieniecki-Konstantinos-Yu renders it obvious to use the Kamieniecki-Konstantinos monitoring in a satellite television context. Since Kamieniecki discloses that its monitoring equipment resides in STB 110, a POSITA would have known that such equipment would be housed in customer premises satellite reception assembly if the system were used for satellite television.

174. Accordingly, it is my opinion that claim 8 is rendered obvious by Kamieniecki-Konstantinos and Kamieniecki-Konstantinos-Yu.

10.1.10 Dependent Claim 9

a. "The method of claim 3, wherein said one or more circuits reside in a customer premises gateway."

175. Kamieniecki describes its components as being included in a set-top box 110. Ex. 1009, [0013]-[0014], Fig. 1. The '008 Patent similarly states that its front end 158, channelizer 152, data processing module 156, and/or monitoring module 154 may reside in a set-top box. Ex. 1001, 4:19-21. The '008 Patent also refers to the terms "set-top box" and "gateway" interchangeably. Ex. 1001, 5:37 ("… satellite gateway/set-top box, …"). Accordingly, the claimed "customer premises gateway" would be understood by a POSITA to encompass set-top boxes like that in Kamieniecki-Konstantinos. To the extent Patent Owner argues that a "customer premises gateway" requires an interface to external networks where they enter the customer premises and is different from a set-top box, it is shown by Kamieniecki-Konstantinos combined with Cholas (Exhibit 1017). Cholas is a published patent application that teaches the unification of functions typically distributed across multiple devices within a network, and specifically combines STB and cable modem functionality for receiving television and data at a premises gateway. Ex. 1017, Abstract, [0006], [0020]-[0022], [0024]-[0035], [0038], [0053]-[0054], [0105], [0109], [0136]-[0140], [0199]-[0202], Figs. 2a-2b, 3, 12-14. Kamieniecki-Konstantinos already provides an interface between: 1) the external network from the headend (e.g., the connection to the headend 102 in Kamieneicki

Figure 1, or the source of cable TV signals in Konstantinos); and 2) user equipment within a premises (e.g., televisions that receive television channel video, computing devices that receive DOCSIS data, etc.). Ex. 1009, [0002], [0004], [0013]-[0014]; Ex. 1010, [0001]-[0003], [0011], [0046], [0106], [0114], [0121], Fig. 9. A POSITA would have considered it obvious to consolidate Kamieniecki-Konstantinos with other devices where the signals enter the premises to form a gateway as shown in Cholas because such a combination is taught by Cholas and would reduce cost and redundancy. A POSITA would have had the skill to include Kamieniecki-Konstantinos into a gateway device like that of Cholas because interconnection of various network and receiver components in a single enclosure was well known as demonstrated by Cholas. Accordingly, it is my opinion that claim 9 is rendered obvious by Kamieniecki-Konstantinos and Kamieniecki-Konstantinos-Cholas.

10.1.11 Dependent Claim 10

a. **"The method of claim 3, wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits."**

176. The '008 Patent describes this "configuring" as informing the channelizer 152 of the "center frequency" and "bandwidth" of the desired bands (C) that should be selected and output for monitoring or data processing. Ex. 1001, 6:10-17. This is illustrated in Fig. 3 of the '008 Patent, which shows the channelizer

having separate selector filters 302 (**green**), each of which is provided with a center frequency (k) and bandwidth (Δ) of a band that it is to select.

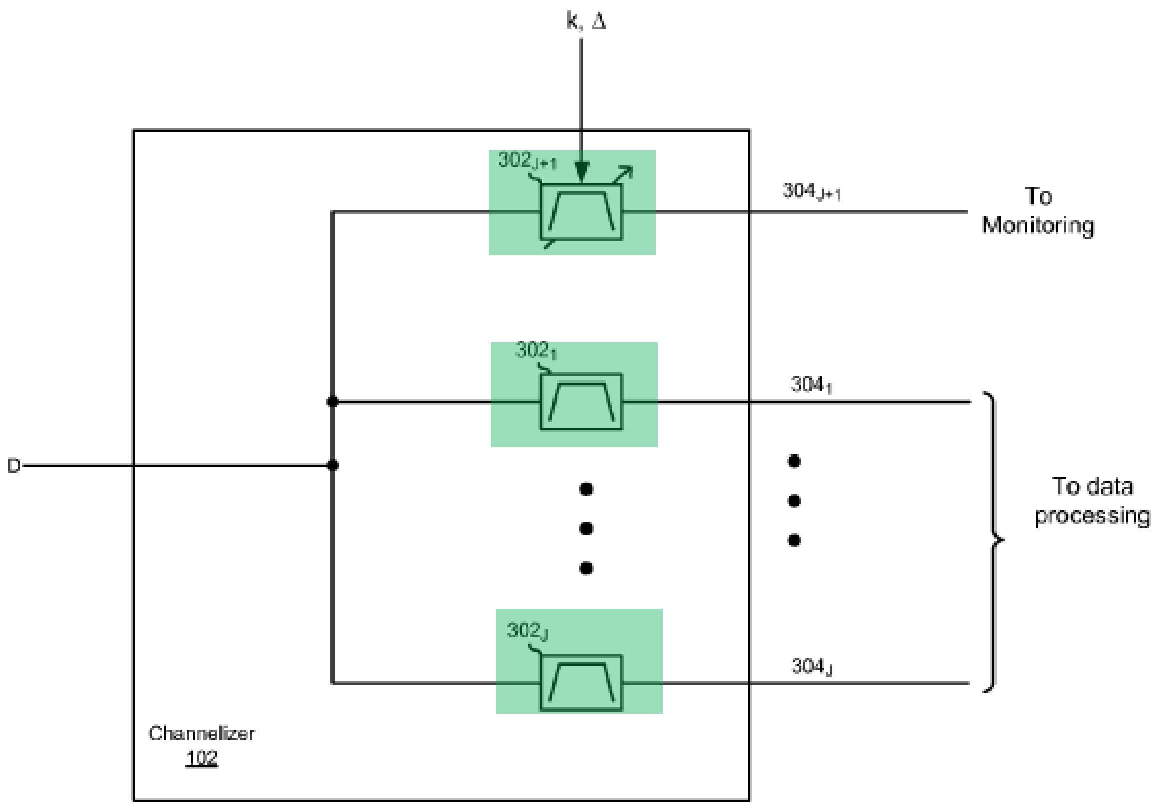


FIG. 3

Ex. 1001, Fig. 3

Id.

177. Similarly, the Konstantinos multi-channel receiver 200 also includes a multi-channel selector 206 with separate channel selectors 207A-N (**green**), each being configured to select a corresponding band (channel):

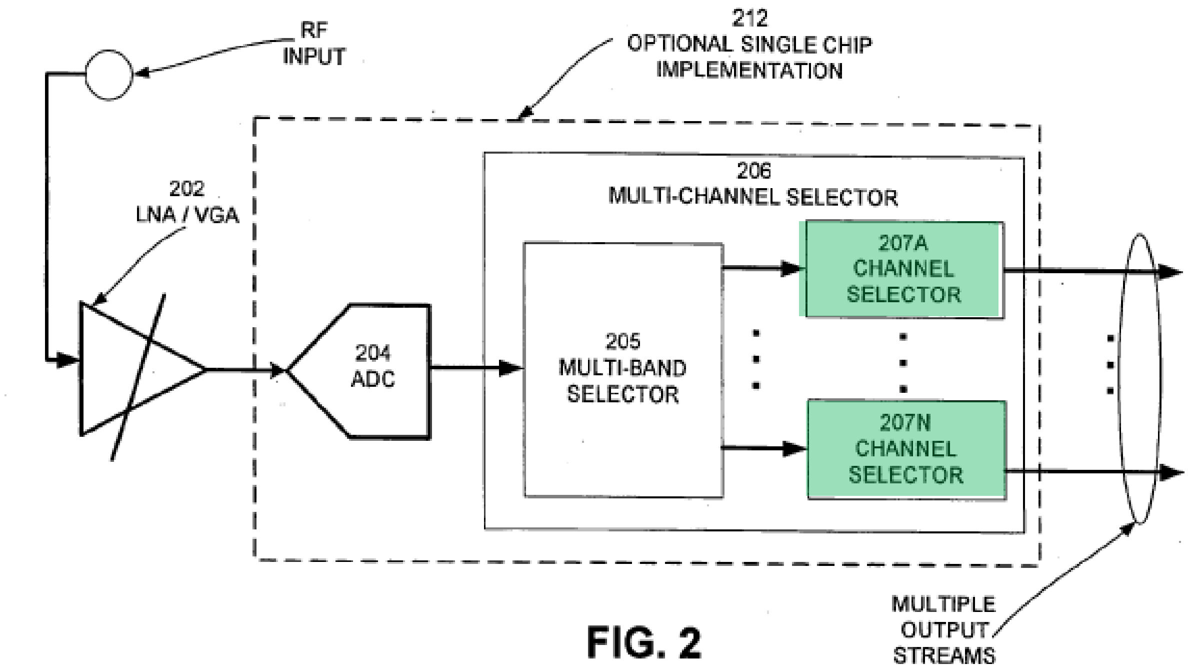
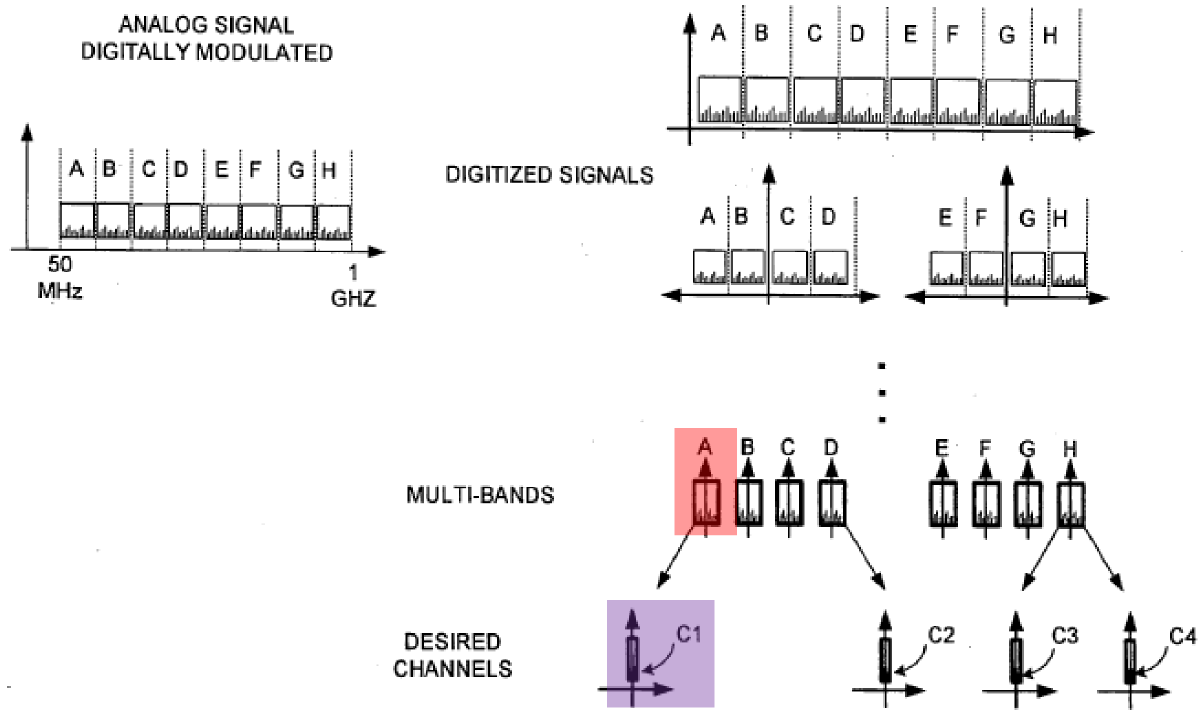


FIG. 2

Ex. 1010, Fig. 2

Ex. 1010, [0045-46], [0048], [0062], [0105]. Konstantinos Figure 3 further provides a visualization of the bands that are selected.

FIG. 3



Ex. 1010, Fig. 3

As illustrated, the original analog frequency range (spanning 50 MHz to 1 GHz) comprises sub-bands (A-H) and desired channels (C1-C4). Each of these sub-bands and channels is identified by its center frequency. For example, the sub-band A (**red**) is shown as having a small horizontal portion of the frequency band – this is the "bandwidth" of the sub-band A; and the sub-band is identified by its center frequency, labeled 'A' with a vertical arrow in the center of that bandwidth. The same is true for the desired channel – channel C1 has a smaller horizontal portion (**purple**) of the frequency band (this is the channel's bandwidth), and is also identified by its center frequency as indicated by the vertical arrow in the middle of

that channel's bandwidth. *Id*. When the channel selectors 207A-N are configured to select desired channels C1-C4, they are configured with the center frequency of those desired channels – this is how the channels are identified in both Konstantinos and the '008 Patent. *Id*. Similarly, the multi-band selectors 205 are configured with the center frequencies of the sub-bands (A-H) that they are to select. *Id*. For each channel to be monitored, a bandwidth and/or center frequency of that channel is selected by its channel selector, and thus is configured during operation of the Konstantinos multi-channel selector 206. Accordingly, it is my opinion that Kamieniecki-Konstantinos renders claim 10 obvious.

10.1.12 Independent Claim 11

a. [11A]: "A system comprising: one or more circuits that are operable to:"

178. It is my opinion that the Kamieniecki-Konstantinos combination results in a system comprising one or more circuits that are operable to perform the various steps recited in claim 11. The steps are discussed further below. The "one or more circuits" are shown by the Kamieniecki STB 110 with the Konstantinos multi-channel receiver 200 (Ex. 1009, Fig. 1; Ex. 1010, Fig. 2), which would perform the steps as discussed below. To the extent this is a means-plus-function element that requires hardware components and software/firmware that perform the recited functions (as discussed in Section 7 above), this is shown by the hardware and/or software that performs the steps discussed below, as well as the Kamieniecki

controller 118 and the program it executes (which may include the software program from the Konstantinos multi-channel receiver 200). Ex. 1009, [0015]; Ex. 1010, [0043], [0122].

b. [11B]: "receive a signal having a bandwidth that spans from a first frequency, F_{lo}, to a second frequency, F_{hi}, wherein said signal carries a plurality of channels;"

179. It is my opinion that Kamieniecki-Konstantinos discloses limitation [11B] as discussed above regarding limitations [1B] and [3B].

c. [11C]: "digitize said received signal from F_{lo} to F_{hi} to generate a digitized signal;"

180. It is my opinion that Kamieniecki-Konstantinos discloses limitation [11C] as discussed above regarding limitations [1B] and [3C].

d. [11D]: "select a first portion of said digitized signal; select a second portion of said digitized signal; and concurrently output said selected first portion and said selected second portion,"

181. It is my opinion that Kamieniecki-Konstantinos discloses limitation [11D] as discussed above regarding limitations [1E] and [3D].

e. **[11E]: "wherein: said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal;"**

182. It is my opinion that Kamieniecki-Konstantinos discloses limitation [11E] as discussed above regarding limitations [1C], [1E], and [3E].

f. **[11F]: "and said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels."**

183. It is my opinion that Kamieniecki-Konstantinos discloses limitation [11F] as discussed above regarding limitations [1D], [1E], and [3F], and that claim 11 is rendered obvious by Kamieniecki-Konstantinos.

10.1.13 Dependent Claim 12

a. **"The system of claim 11, wherein said first portion comprises all of said received signal from F_{lo} to F_{hi}."**

184. It is my opinion that claim 12 is rendered obvious by Kamieniecki-Konstantinos as discussed above regarding claim 4.

10.1.14 Dependent Claim 13

a. "The system of claim 11, wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate."

185. It is my opinion that claim 13 is rendered obvious by Kamieniecki-Konstantinos as discussed above regarding claim 5.

10.1.15 Dependent Claim 14

a. "The system of claim 11, wherein: said received signal is a cable television signal; and said plurality of channels comprises a plurality of television channels."

186. It is my opinion that claim 14 is rendered obvious by Kamieniecki-Konstantinos as discussed above regarding claim 6.

10.1.16 Dependent Claim 15

a. "The system of claim 11, wherein: said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels."

187. It is my opinion that claim 15 is rendered obvious by Kamieniecki-Konstantinos and Kamieniecki-Konstantinos-Yu as discussed above regarding claim 7.

10.1.17 Dependent Claim 16

a. "The system of claim 15, wherein said one or more circuits reside in a customer premises satellite reception assembly."

188. It is my opinion that claim 16 is rendered obvious by Kamieniecki-Konstantinos and Kamieniecki-Konstantinos-Yu as discussed above regarding claim 8.

10.1.18 Dependent Claim 17

a. "The system of claim 11, wherein said one or more circuits reside in a customer premises gateway."

189. It is my opinion that claim 17 is rendered obvious by Kamieniecki-Konstantinos and Kamieniecki-Konstantinos-Cholas as discussed above regarding claim 9.

10.1.19 Dependent Claim 18

a. "The system of claim 11, wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits."

190. It is my opinion that claim 18 is rendered obvious by Kamieniecki-Konstantinos as discussed above regarding claim 10.

10.2 Grounds D and E: Claims 1-6, 9-14, and 17-18 are Rendered Obvious by Renken, and Claims 9 and 17 are Rendered Obvious by Renken in view of Cholas

191. The following section provides a limitation by limitation analysis showing how Renken renders claims 1-6, 9-14, and 17-18 obvious. My discussion incorporates by reference the paragraphs regarding Renken above, and will offer specific details below. To help illustrate how the disclosures of these references map to the claim limitations, I have color coded some of my remarks and some figures in the noted art below.

10.2.1 Independent Claim 1

192. As I explain below, it is my opinion that claim 1 of the ’008 Patent would have been obvious to a POSITA in view of Renken. The elements of claim 1 appear in the Claims Listing Appendix, labeled as elements [1A]-[1E], and I refer to these elements by their labels below.

a. [1A]: “A system comprising:”

193. As I explain below, Renken renders obvious the elements of the “system” claimed in the preamble of claim 1 of the ’008 Patent.

b. [1B]: "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;"

194. It is my opinion that Renken discloses "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal," as claimed.

195. Renken describes an analog-to-digital converter (ADC) 25 (**red**), which is part of the downstream receiver circuit of the measurement-capable cable modem (MCCM). Ex. 1011, 11:39-48, Fig. 3; Ex. 1012, pp. 6 (Fig. 2), 7. This is seen in Figure 2 from the Renken Provisional below, although the substantially same figure, with ADC 25, appears as Figure 3 of Renken.

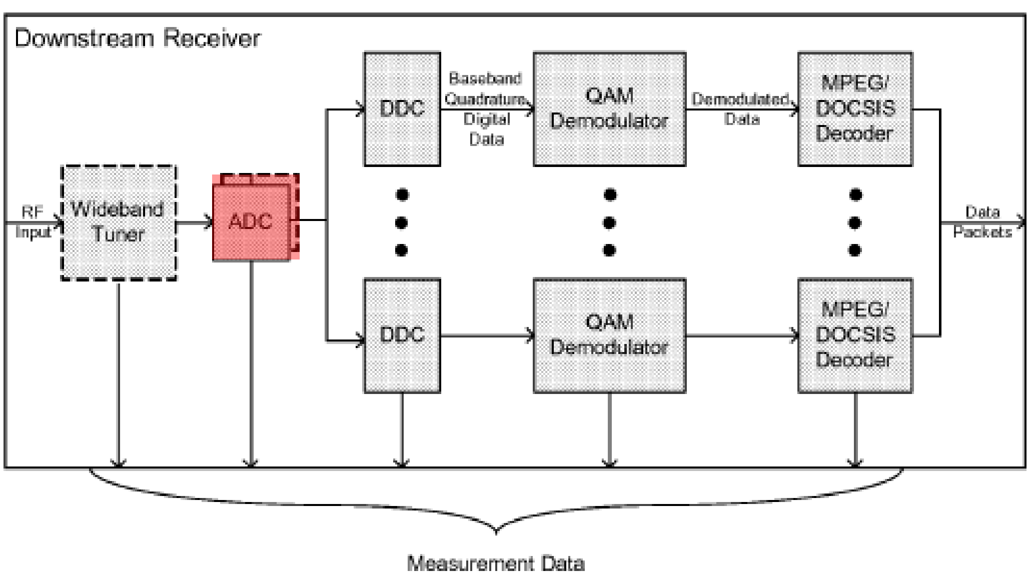


Fig. 2

Ex. 1012, Fig. 2 (annotated)

196. RF input ("received signal") is received by an optional wideband tuner and converted to intermediate frequency (IF) signals, which the ADC converts into a digitized form ("digitized signal"). Ex. 1011, 11:28-40, Fig. 3; Ex. 1012, pp. 6-7, Fig. 2. The conversion of the RF signals to IF signals simply changes the frequency at which the signals are centered, and does not otherwise change the substantive content of those signals.

197. Renken describes that the wideband tuner has a bandwidth as wide as 1 GHz, receiving an input from the diplexer cutoff frequency to approximately 1 GHz, and this coincides with the 1 GHz (55 MHz to 1002 MHz) cable TV frequency range in the '008 Patent. Ex. 1011, 11:30-34; Ex. 1012, p. 6; Ex. 1001, 4:11-13. Renken also states that the output of the ADC "typically covers the entire downstream frequency span of the wideband tuner." Ex. 1011, 12:31-32; Ex. 1012, p. 7.

198. In the U.S., cable systems typically have upstream signals from 5 to 42 MHz, and downstream signals from 54 MHz to 864 MHz. Because of this two-way transmission on a common cable, diplexers were used to help isolate the upstream signals from the downstream ones – e.g., a high-pass filter would allow higher frequencies to pass in the downstream direction and block lower frequencies from passing in the downstream direction, while a low-pass filter would allow lower frequencies to pass in the upstream direction and block higher frequencies from

passing in the upstream direction. The "cutoff" frequency refers to a boundary between what a filter will pass and what a filter will block, and a POSITA would have understood Renken's reference to a diplexer cutoff frequency as referring to the lower boundary of the high-pass filter for downstream transmissions. In the U.S., this would have been 54 MHz.

199. Renken's RF input includes a "plurality of television channels" as Renken describes measuring signals for TV channels, as well as data channels, in a cable television (CATV) network. Ex. 1011, Abstract, 7:42-60, 11:55-56, 15:24-26, 18:38-43, 20:32-42; Ex. 1012, pp. 3, 6, 14. Indeed, Renken refers to its tuner as a "wideband" tuner, and the term "wideband" was understood by POSITA to mean the tuner can tune to a multiplicity of channels. Further, Renken's inclusion of the MPEG/DOCSIS Decoder shows that TV and data channels are included – MPEG is a standard used for encoding video (e.g., television channels), while DOCSIS is a standard used for encoding data channels (e.g., the Internet). Ex. 1011, 11:19-23, 17:36-38; Ex. 1012, pp. 6 (Fig. 2), 7-8, 14.

200. It is, therefore, my opinion that Renken discloses "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal," as claimed.

c. [1C]: "a signal monitor operable to: analyze said digitized signal to determine a characteristic of said digitized signal; and report said determined characteristic to a source of said received signal;"

201. It is my opinion that Renken discloses "a signal monitor operable to: analyze said digitized signal to determine a characteristic of said digitized signal; and report said determined characteristic to a source of said received signal," as claimed.

202. Renken describes an MCCM processor executing a measurement program ("signal monitor") to obtain signal measurements. Ex. 1011, 10:15-31; Fig. 2; Ex. 1012, pp. 5-6, Fig. 1 (p. 5). For example, the measurement program can obtain spectrum measurements using the ADC, and can analyze data from various components to determine characteristics such as Bit Error Rate (BER), Signal-to-Noise Ratio (SNR), Modulation Error Ratio (MER), and Carrier-to-Noise Ratio (CNR). Ex. 1011, 3:12-20, 11:39-12:5, 13:6-15, 16:17-17:17; Ex. 1012, pp. 3-5, 14. For example, the measurement program analyzes data from the MPEG/DOCSIS Decoder to determine characteristics such as Bit Error Rate. Ex. 1011, 13:8-21; Ex. 1012, pp. 7-8, 14. Data from other components, such as the DDC and QAM demodulator, can also be used for measurements. Ex. 1011, 12:6-13:38; Ex. 1012, pp. 3-8, 13-15.

203. While Renken expressly refers to Signal-to-Noise Ratio (SNR), the Renken Provisional does not. Ex. 1011, 3:18, 13:1. However, the Renken Provisional refers to Carrier-to-Noise Ratio (CNR), and a POSITA would have understood that SNR is analogous to CNR, and that Renken's disclosure of CNR would at least have rendered obvious measuring SNR. A POSITA would understand that both the CNR and SNR are a ratio relative to noise, and that the difference depends on when the measurement is taken. A baseband video signal is modulated onto an RF carrier frequency for transmission, and after reception it is demodulated and the baseband video is recovered. The CNR is a measurement done on the RF signal before that demodulation, while the SNR is a measurement on the baseband signal after demodulation.

204. Renken includes signal-to-noise ratio, which a POSITA would understand is used similarly to modulation error ratio. Ex. 1011, 12:58-13:5. A POSITA would understand that signal-to-noise ratio (SNR) was a typical measurement of the quality of an analog video signal, but for digital video signals, the corresponding measurement of quality is the modulation error ratio (MER), and that the terms SNR and MER were often used interchangeably, depending on whether analog or digital video was being addressed. For example, U.S. Patent Publication 2008/0089402, mentioned in Renken, states that the MER is "an

estimate of the signal to noise ratio (SNR) of the digital signal." Ex. 1011, 13:3; Ex. 1024, [0051].

205. The '008 Patent refers to the cable headend as the "source of the received signal," and describes sending measured characteristics to the headend. Ex. 1001, 3:55-57. Similarly, Renken discloses that the MCCM sends its measurement results to the CMC, which Renken states may be at the headend. Ex. 1011, Abstract, 9:15-18, 18:11-14, Fig. 8 (Step 540). The Renken Provisional also states that results are sent to the CMC, but does not explicitly say that the CMC is located at the headend. Ex. 1012, pp. 10, 13. A POSITA would have understood that the headend receives upstream transmissions from cable modems in a cable network, so it would at least be obvious that the results are sent to the headend. Further, the headend is the most logical place to send the results, and the Renken Provisional does not know where *else* the results would be sent. Ex. 1012, p. 4 ("Monitoring using the CPE but sending the results somewhere other than the head end (where, I don't know …)").

206. In a cable network as described in Renken and the Renken Provisional, and as discussed in Section 9.1 above, a headend is on one end of the network of cables (the "upstream" end) and the various subscriber modems/set-top boxes are on the other end (the "downstream" end). The subscriber devices communicate with the headend. The headend transmits downstream signals onto the network of cables, for receipt by the subscriber modems/set-top boxes, and the subscriber modems/set-

top boxes transmit upstream signals onto the network of cables, and they would be received by the headend. Ex. 1012, p. 5, Fig. 1. This is the general structure illustrated in Figure 1 of Renken, and a POSITA seeing the reference to headend, cable modem, CATV network, and cable plant in the Renken Provisional would have understood those to be referring to the same structure.

207. A POSITA would have at least considered it obvious to place the CMC at the headend, since the CMC coordinates measurements across a plurality of MCCMs. Ex. 1012, pp. 4, 12-15. The upstream transmissions from the cable modems in a cable network traverse upstream, through the intervening network of cables, to arrive at the headend. Since the upstream signals are arriving at the headend anyway, it would be logical to place the CMC at the headend, for ease of access to the measurement results being reported by the MCCMs.

208. It is, therefore, my opinion that Renken discloses "a signal monitor operable to: analyze said digitized signal to determine a characteristic of said digitized signal; and report said determined characteristic to a source of said received signal," as claimed.

d. [1D]: "a data processor operable to process a television channel to recover content carried on the television channel; and"

209. It is my opinion that Renken discloses "a data processor operable to process a television channel to recover content carried on the television channel," as claimed.

210. Television channels need to be processed so that their content can be recovered and viewed. For example, a television channel typically contains audio and video, and there are various encoding standards for representing that audio and video in a digital format. An industry group, the Moving Picture Experts Group (MPEG), provides one such standard, referenced in both Renken and the Renken Provisional. Ex. 1011, 6:38, 11:21, 13:6-21, 17:36-38; Ex. 1012, pp. 7-8. After an MPEG stream is received, it will need to be decoded ("processed") to recover the audio and video so that it can be displayed for a user. MPEG decoders were well-known to a POSITA, and would have been necessary for decoding MPEG streams. For example, U.S. Patent Publication No. 2004/0181813 ("Ota"), published in 2004, describes use of multiple MPEG decoders to support rapid channel changes. Ex. 1015, [0004]-[0007], [0020], [0023], [0026]-[0027].

211. The '008 Patent describes its data processing module 156 as recovering data present in a television channel, and expressly lists "decoding" as a function of the data processing module 156. Ex. 1001, 3:64-66. Similarly, Renken describes a

MPEG/DOCSIS Decoder (**purple**) ("data processor"), which is found in each of the receivers in the MCCM. Ex. 1011, 11:19-22, 13:6-8, Fig. 3; Ex. 1012, pp. 6-8 (Fig. 2).

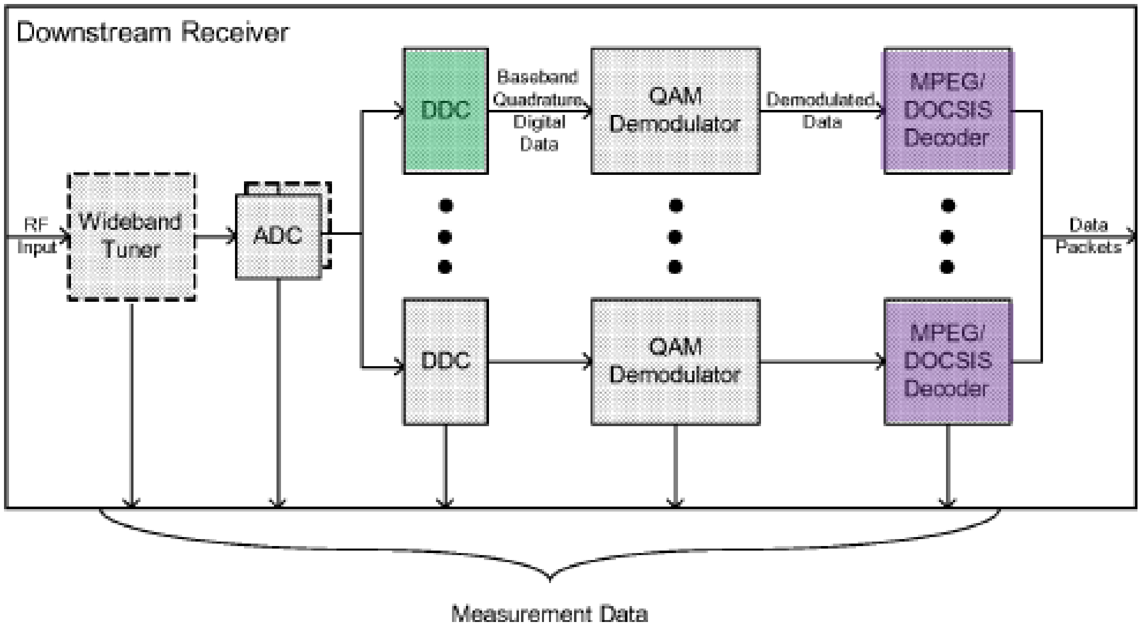


Fig. 2

Ex. 1012, Fig. 2 (annotated)

212. Renken states that the decoding function of its MPEG/DOCSIS Decoder is already known in the art, and does not expressly state that the MPEG/DOCSIS Decoder processes a television channel to recover its content. Ex. 1011, 13:6-21; Ex. 1012, pp. 5-6. A POSITA would have known that MPEG decoders are used for recovering video content from television channels, and this is what the MPEG/DOCSIS Decoder would have done with a television channel stream that is selected by its corresponding digital down converter (DDC) (**green**).

For example, Ota, as discussed above, shows the use of MPEG decoders to recover video content of television channels. Ex. 1015, [0004]-[0007], [0020], [0023], [0026]-[0027]. A POSITA would have known that such decoders would be data processors or would be implemented using data processors or data processor circuits. Additionally, the Renken QAM demodulator can also be considered an example of the claimed "data processor." A demodulator operates to recover data that has been modulated onto a channel's carrier.

213. Therefore, it is my opinion that Renken discloses "a data processor operable to process a television channel to recover content carried on the television channel," as claimed.

e. [1E]: "a channelizer operable to: select a first portion of said digitized signal; select a second portion of said digitized signal; and concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor."

214. It is my opinion that Renken discloses "a channelizer operable to: select a first portion of said digitized signal; select a second portion of said digitized signal; and concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor," as claimed.

215. Renken describes a number of parallel digital down converters (DDC) (**green**) ("channelizer"), each responsible for filtering out, or selecting, a particular downstream channel. Ex. 1011, 12:22-23; Ex. 1012, p. 7.

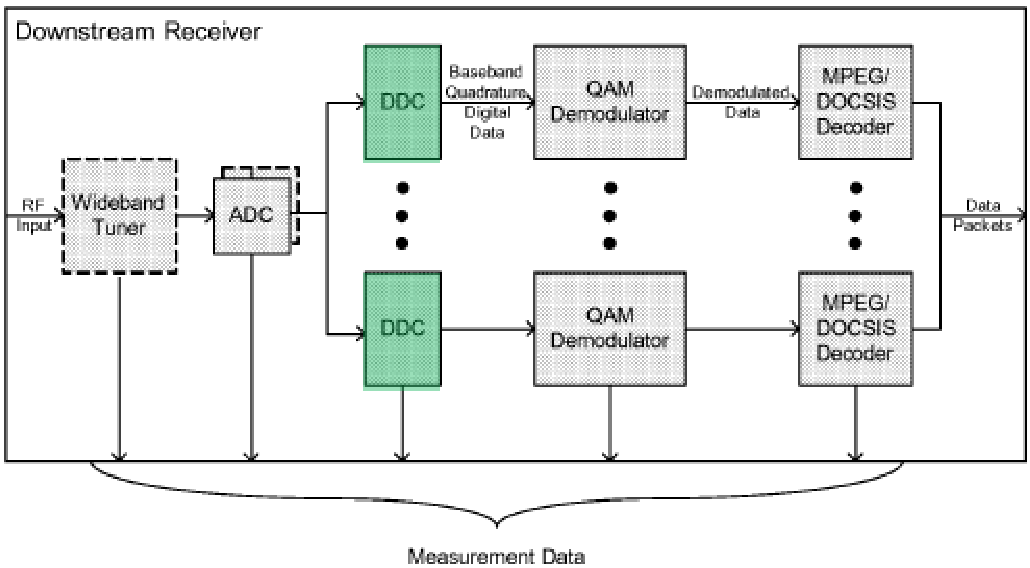


Fig. 2

Ex. 1012, Fig. 2 (annotated)

216. The MCCM 100 determines which DDC (and its associated QAM demodulator and MPEG/DOCSIS decoder) to use for channels/signals to be monitored ("a first portion of said digitized signal") and which to use for channels to decode for viewing by a subscriber ("a second portion of said digitized signal") using the MPEG/DOCSIS Decoder. Ex. 1011, 4:34-44, 4:60-67, 10:5-48, 16:32-36, 20:41-43; Ex. 1012, pp. 3, 9, 13. In operation, a first DDC may select a channel that the processor (monitor) desired to be measured and either the DDC or other downstream components (e.g., QAM Demodulator or MPEG/DOCSIS Decoder)

send data to the processor as directed by the measurement program, while a second DDC may concurrently select a channel (e.g., a television channel) to be decoded by MPEG/DOCSIS Decoder for viewing.

217. Therefore, it is my opinion that Renken discloses "a channelizer operable to: select a first portion of said digitized signal; select a second portion of said digitized signal; and concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor," as claimed, and that Renken renders claim 1 obvious.

10.2.2 Dependent Claim 2

a. "The system of claim 1, wherein said first portion of said digitized signal spans said entire television spectrum."

218. It is my opinion that Renken renders obvious "The system of claim 1, wherein said first portion of said digitized signal spans said entire television spectrum."

219. Renken discloses a measurement plan specifying channels to be tested; that different cable modems may have different measurement capabilities; and that future versions of the DOCSIS standard will necessitate greater numbers of receivers 21. Ex. 1011, 10:62-67, 20:36-41, 23:52-54. A POSITA would have wanted to be able to monitor all channels so that a failed channel can be detected and repaired quickly to minimize customer complaint. It would at least have been obvious to a POSITA that, with sufficient receivers, every available channel could be monitored

at one time. Indeed, different physical cables may experience different impairments, such as interference and cable damage, and different subscribers in a cable network will have at least some different cables (e.g., cable wiring for one house is different from cable wiring for a neighbor, though they may both connect together at a neighborhood trunk node leading to the headend), so it would have been desirable to make signal measurements at every subscriber. Cost and processing demands may place limits on how many receivers a particular modem will have, but a POSITA would have known that technological advances typically reduce costs and increase performance, so it would have been obvious that a Renken MCCM could have been outfitted with enough receivers to monitor every channel in a television spectrum.

220. The Renken Provisional, incorporated by reference in Renken, states that its CMC may monitor measurement results "from across the entire downstream spectrum at any or all subscriber locations equipped with MCCMs". Ex. 1012, p. 4; Ex. 1011, 1:7-10. This shows that in at least one embodiment, an "entire television spectrum" would be the "first portion" monitored by the MCCM 100.

221. As described by Renken, downstream channels can be from 50 MHz to 1002 MHz. Ex. 1011, 2:12-16. As explained above in [1B], the entire spectrum is digitized by the ADC. Then, each DDC can select a particular downstream channel from the entire spectrum. Ex. 1011, 12:22-24. As described in [1E], the output from

each DDC can be used for signal monitoring and/or data processing (data/television). Thus, any (or all) channels spanning the entire television spectrum 54-1000 MHz can be used for signal monitoring ("first portion of said digitized signal").

222. Therefore, it is my opinion that Renken discloses "[t]he system of claim 1, wherein said first portion of said digitized signal spans said entire television spectrum," as claimed, and that Renken renders claim 2 obvious.

10.2.3 Independent Claim 3

a. [3A]: "A method comprising: performing by one or more circuits:"

223. It is my opinion that limitation [3A] is shown for the same reasons discussed above regarding limitation [1A].

b. [3B]: "receiving a signal having a bandwidth that spans from a first frequency, F_{lo}, to a second frequency, F_{hi}, wherein said signal carries a plurality of channels;"

224. Limitation [3B] is shown as discussed above regarding limitation [1B]. The claim does not specify values for the frequencies F_{lo} and F_{hi}, and the specification of the '008 Patent states that the example it gives (F_{lo} ≈55 MHz, F_{hi} ≈1002 MHz) is merely for illustration and is "not intended to be limiting." Ex. 1001, 4:11-15. Accordingly, the claimed F_{lo} and F_{hi} equally apply to the 1 GHz wide Renken bandwidth, as discussed above regarding limitation [1B].

225. Therefore, it is my opinion that Renken discloses limitation [3B].

c. **[3C]: "digitizing said received signal from F_{lo} to F_{hi} to generate a digitized signal;"**

226. It is my opinion that limitation [3C] is shown for the same reasons discussed above regarding limitation [1B] in view of the discussion of limitation [3B].

d. **[3D]: "selecting a first portion of said digitized signal; selecting a second portion of said digitized signal; and concurrently outputting said selected first portion and said selected second portion,"**

227. It is my opinion that limitation [3D] is shown for the same reasons discussed above regarding limitation [1E].

e. **[3E]: "wherein: said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which reports said determined one or more characteristics to a source of said received signal;"**

228. It is my opinion that limitation [3E] is shown for the same reasons discussed above regarding limitations [1C] and [1E].

f. **[3F]: "and said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels."**

229. It is my opinion that limitation [3F] is shown for the same reasons discussed above regarding limitations [1D] and [1E].

10.2.4 Dependent Claim 4

a. "The method of claim 3, wherein said first portion comprises all of said received signal from F_{lo} to F_{hi}."

230. It is my opinion that claim 4 is shown for the same reasons discussed above regarding claim 2 and Limitation [3B].

10.2.5 Dependent Claim 5

a. "The method of claim 3, wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate."

231. Renken lists a variety of measurement capabilities of its modem, including "carrier level," and uses "level" interchangeably with "power." Ex. 1011, 11:56-66, 17:11-20, 19:21-24. The Renken Provisional also lists signal level measurements including "digital channel level," and a POSITA would have understood to have referred to signal power. Ex. 1012, pp. 3-4, 14. Accordingly, Renken's level measurement for a given channel would be "signal power vs. frequency."

232. Renken also lists Carrier-to-Noise ratio (CNR) and Bit Error Rate (BER). Ex. 1011, 11:39-59, 13:6-15, 16:43-17:17; Ex. 1012, pp. 3-4, 7, and 14. While Renken expressly refers to Signal-to-Noise Ratio (SNR), the Renken Provisional does not. Ex. 1011, 3:18, 13:1. However, the Renken Provisional refers

to Carrier-to-Noise Ratio (CNR), and a POSITA would have understood that SNR is analogous to CNR, and that Renken's disclosure of CNR would at least have rendered obvious measuring SNR. Indeed, a POSITA would have understood that SNR is a well-known metric for measuring picture quality and customer satisfaction in a cable television system. Ex. 1026, p. 82.

233. Therefore, it is my opinion that claim 5 is rendered obvious by Renken.

10.2.6 Dependent Claim 6

a. "The method of claim 3 wherein: said received signal is a cable television signal; and said plurality of channels comprises a plurality of television channels."

234. Renken discloses the "television channels" as discussed above regarding limitation [1B]. As for the RF input being a "cable television signal," Renken describes its downstream channels as being delivered via a "cable plant" of a "CATV network" (cable television network). Ex. 1011, 5:21, 7:10, 7:43-61; Ex. 1012, p. 3.

235. Therefore, it is my opinion that claim 6 is rendered obvious by Renken.

10.2.7 Dependent Claim 9

a. "The method of claim 3, wherein said one or more circuits reside in a customer premises gateway."

236. Renken describes a measurement capable cable modem ("customer premises gateway") which a POSITA would understand is located at a subscriber's

premises in order to connect the subscriber to the cable television system. Ex. 1011, 4:21-44, Figs. 1-2; Ex. 1012, pp. 3-5, Fig. 1.

237. The term "modem" originates from an acronym for "Modulator/Demodulator," and the '008 Patent describes its gateways as performing both of these functions. The '008 Patent further describes its gateways as modulating upstream messages. Ex. 1001, 2:62-63. The '008 Patent describes its monitoring module as being operable to demodulate a downstream signal, and that the monitoring module may reside in a gateway. Ex. 1001, 3:57-60, 4:60-63. Accordingly, a POSITA would understand that the claimed "customer premises gateway" would read on the Renken cable modem. To the extent Patent Owner argues that a "customer premises gateway" requires an interface to external networks where they enter the customer premises and is different from a cable modem, it is shown by Renken combined with Cholas (Exhibit 1017). Cholas is a published patent application that teaches the unification of functions typically distributed across multiple devices within a network, and specifically combines STB and cable modem functionality for receiving television and data at a premises gateway. Ex. 1017, Abstract, [0006], [0020]-[0022], [0024]-[0035], [0038], [0053]-[0054], [0105], [0109], [0136]-[0140], [0199]-[0202], Figs. 2a-2b, 3, 12-14. The Renken MCCM already shows an interface between: 1) the external network via the RF connector; and 2) the user equipment that would use the MPEG video and/or

DOCSIS data provided by, for example, the MPEG/DOCSIS decoder in the MCCM. Ex. 1011, 7:42-67, 13:6-8, Fig. 3; Ex. 1012, pp. 3-7, Fig. 2 (p. 6). A POSITA would have considered it obvious to consolidate the Renken MCCM with other devices where the signals enter the premises to form a gateway as shown in Cholas because such a combination is taught by Cholas and would reduce cost and redundancy. A POSITA would have had the skill to include Renken's MCCM in a gateway device like that of Cholas because interconnection of various network and receiver components in a single enclosure was well known as demonstrated by Cholas. Accordingly, it is my opinion that Renken and Renken-Cholas render obvious claim 9.

10.2.8 Dependent Claim 10

a. "The method of claim 3, wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits."

238. As I discussed above in Section 10.1.11 regarding claim 10 in Ground A, the '008 Patent uses the configuration of this "center frequency" and "bandwidth" simply to refer to how desired bands (C) are identified for the channelizer should select. Ex. 1001, 6:10-13. Renken's DDC similarly selects a desired channel, such as a "6 or 8 MHz wide channel." Ex. 1011, 12:22-24, 13:48-57, 14:59-64, 18:22-38, 19:24-29; Ex. 1012, p. 7.

239. Television and data channels are typically identified by a corresponding channel frequency, and that frequency is a center frequency used as a carrier for modulating data. In the U.S., a television channel spans a 6 MHz wide frequency band, centered around a carrier frequency.

240. A POSITA would have understood that channels are selected specifying their center frequency as Renken describes. Ex. 1011, 12:22-34, 13:48-57, 14:59-64, 18:22-38, 19:24-29; Ex. 1012, pp. 6-7.

241. Accordingly, it is my opinion that claim 10 is rendered obvious by Renken.

10.2.9 Independent Claim 11

a. [11A]: "A system comprising: one or more circuits that are operable to:"

242. It is my opinion that Renken discloses a system comprising one or more circuits that are operable to perform the various steps recited in claim 11. The steps are discussed further below. The "one or more circuits" are shown by the Renken MCCM, performing the steps discussed below. To the extent this requires hardware components and software/firmware, the Renken processor 50 controls the monitoring by executing a measurement program stored in non-volatile memory 70. Ex. 1011, 10:12-31; Ex. 1012, pp. 5-6.

b. [11B]: "receive a signal having a bandwidth that spans from a first frequency, F_{lo}, to a second frequency, F_{hi}, wherein said signal carries a plurality of channels;"

243. It is my opinion that Renken discloses limitation [11B] as discussed above regarding limitations [1B] and [3B].

c. [11C]: "digitize said received signal from F_{lo} to F_{hi} to generate a digitized signal;"

244. It is my opinion that Renken discloses limitation [11C] as discussed above regarding limitations [1B] and [3C].

d. [11D]: "select a first portion of said digitized signal; select a second portion of said digitized signal; and concurrently output said selected first portion and said selected second portion,"

245. It is my opinion that Renken discloses limitation [11D] as discussed above regarding limitations [1E] and [3D].

e. [11E]: "wherein: said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal;"

246. It is my opinion that Renken discloses limitation [11E] as discussed above regarding limitations [1C], [1E], and [3E].

f. [11F]: "and said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels."

247. It is my opinion that Renken discloses limitation [11F] as discussed above regarding limitations [1D], [1E], and [3F], and that claim 11 is rendered obvious by Renken.

10.2.10 Dependent Claim 12

a. "The system of claim 11, wherein said first portion comprises all of said received signal from F_{lo} to F_{hi}."

248. It is my opinion that claim 12 is rendered obvious by Renken as discussed above regarding claim 4.

10.2.11 Dependent Claim 13

a. "The system of claim 11, wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate."

249. It is my opinion that claim 13 is rendered obvious by Renken as discussed above regarding claim 5.

10.2.12 Dependent Claim 14

a. **"The system of claim 11, wherein: said received signal is a cable television signal; and said plurality of channels comprises a plurality of television channels."**

250. It is my opinion that claim 14 is rendered obvious by Renken as discussed above regarding claim 6.

10.2.13 Dependent Claim 17

a. **"The system of claim 11, wherein said one or more circuits reside in a customer premises gateway."**

251. It is my opinion that claim 17 is rendered obvious by Renken and Renken-Cholas as discussed above regarding claim 9.

10.2.14 Dependent Claim 18

a. **"The system of claim 11, wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits."**

252. It is my opinion that claim 18 is rendered obvious by Renken as discussed above regarding claim 10.

11. CONCLUSION

253. All of the statements made in this declaration of my own knowledge are true. All statements made based on information and belief are believed to be true. I declare under penalty of perjury that the foregoing is true and correct.

Dated: 2/16/2024 By: David B. Lett

David B. Lett

CLAIM LISTING APPENDIX

U.S. Pat. No. 8,792,008

Designation	Claim Language
Claim 1	
[1A]	1. A system comprising:
[1B]	an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;
[1C]	a signal monitor operable to: analyze said digitized signal to determine a characteristic of said digitized signal; and report said determined characteristic to a source of said received signal;
[1D]	a data processor operable to process a television channel to recover content carried on the television channel; and
[1E]	a channelizer operable to: select a first portion of said digitized signal; select a second portion of said digitized signal; and concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.
Claim 2	
2	2. The system of claim 1, wherein said first portion of said digitized signal spans said entire television spectrum.
Claim 3	
[3A]	3. A method comprising: performing by one or more circuits:
[3B]	receiving a signal having a bandwidth that spans from a first frequency, F_{lo}, to a second frequency, F_{hi}, wherein said signal carries a plurality of channels;
[3C]	digitizing said received signal from F_{lo} to F_{hi} to generate a digitized signal;
[3D]	selecting a first portion of said digitized signal; selecting a second portion of said digitized signal; and concurrently outputting said selected first portion and said selected second portion,
[3E]	wherein: said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which

Designation	Claim Language
	reports said determined one or more characteristics to a source of said received signal;
[3F]	and said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels.
Claim 4	
4	4. The method of claim 3, wherein said first portion comprises all of said received signal from F_{lo} to F_{hi}.
Claim 5	
5	5. The method of claim 3, wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.
Claim 6	
6	6. The method of claim 3 wherein: said received signal is a cable television signal; and said plurality of channels comprises a plurality of television channels.
Claim 7	
7	7. The method of claim 3, wherein: said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels.
Claim 8	
8	8. The method of claim 7, wherein said one or more circuits reside in a customer premises satellite reception assembly.
Claim 9	
9	9. The method of claim 3, wherein said one or more circuits reside in a customer premises gateway
Claim 10	
10	10. The method of claim 3, wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits.
Claim 11	
[11A]	11. A system comprising: one or more circuits that are operable to:

Designation	Claim Language
[11B]	receive a signal having a bandwidth that spans from a first frequency, F_{lo}, to a second frequency, F_{hi}, wherein said signal carries a plurality of channels;
[11C]	digitize said received signal from F_{lo} to F_{hi} to generate a digitized signal;
[11D]	select a first portion of said digitized signal; select a second portion of said digitized signal; and concurrently output said selected first portion and said selected second portion,
[11E]	wherein: said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal;
[11F]	and said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels.
Claim 12	
12	12. The system of claim 11, wherein said first portion comprises all of said received signal from F_{lo} to F_{hi}.
Claim 13	
13	13. The system of claim 11, wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.
Claim 14	
14	14. The system of claim 11, wherein: said received signal is a cable television signal; and said plurality of channels comprises a plurality of television channels.
Claim 15	
15	15. The system of claim 11, wherein: said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels.
Claim 16	
16	16. The system of claim 15, wherein said one or more circuits reside in a customer premises satellite reception assembly.
Claim 17	

Designation	Claim Language
17	17. The system of claim 11, wherein said one or more circuits reside in a customer premises gateway.
Claim 18	
18	18. The system of claim 11, wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits.